Plant Pests of Importance to North American Agriculture

INDEX OF PLANT DISEASES IN THE UNITED STATES

AGRICULTURE HANDBOOK
No. 165

Crops Research Division
Agricultural Research Service

UNITED STATES DEPARTMENT of AGRICULTURE

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CROPS RESEARCH DIVISION
AGRICULTURAL RESEARCH SERVICE
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PREFACE

This Handbook is truly a cooperative accomplishment. Ever since the Plant Disease Survey was founded, in 1917, each member of the staff has, at one time or another, worked on the project. Paul R. Miller directed the work. Freeman Weiss compiled the first part of the Handbook; Muriel J. O'Brien took over the task of completing it. J. A. Stevenson was responsible for checking fungus nomenclature; Nellie W. Nance, for abstracting and cataloging much of the basic data; and Jessie I. Wood, for critical review. Host nomenclature was checked by S. F. Blake and his associates in the New Crops Research Branch, and nematode names by workers in the Crops Protection Research Branch, Nematology Section.

The principal sources of data were reports from plant pathologists throughout the country to the Mycology and Plant Disease Reporting Section (formerly the Plant Disease Survey), and the Section's index of the literature on plant-disease occurrence. The National Fungus Collection of the Smithsonian Institution (formerly the Mycological Collections of the Department of Agriculture) constituted another source of information, as well as a means of verifying identification of disease-producing organisms.

This Handbook supersedes Department Bulletin 1366, "A Check List of Economic Plants of the United States," issued in 1926. It replaces the processed report, "Index of Plant Diseases in the United States," issued in six parts, from 1950 to 1953.

The Handbook does not constitute a revision of the "Index," issued from 1950 to 1953. There are no real changes in content. Condensation of the introductory explanation, and some minor changes, mainly in the host descriptions, to permit better arrangement of the printed page, are the most conspicuous differences from the original "Index." The only nomenclatorial changes are insertion of the current names of the root-knot nematode and the curly-top virus in the first part and correction of *Xanthomonas solanacearum* to *Pseudomonas solanacearum* in the latter part of the Handbook. Authorities for species are more consistently cited, and a few typographical errors are corrected. There are no additions to hosts, diseases, or distribution.

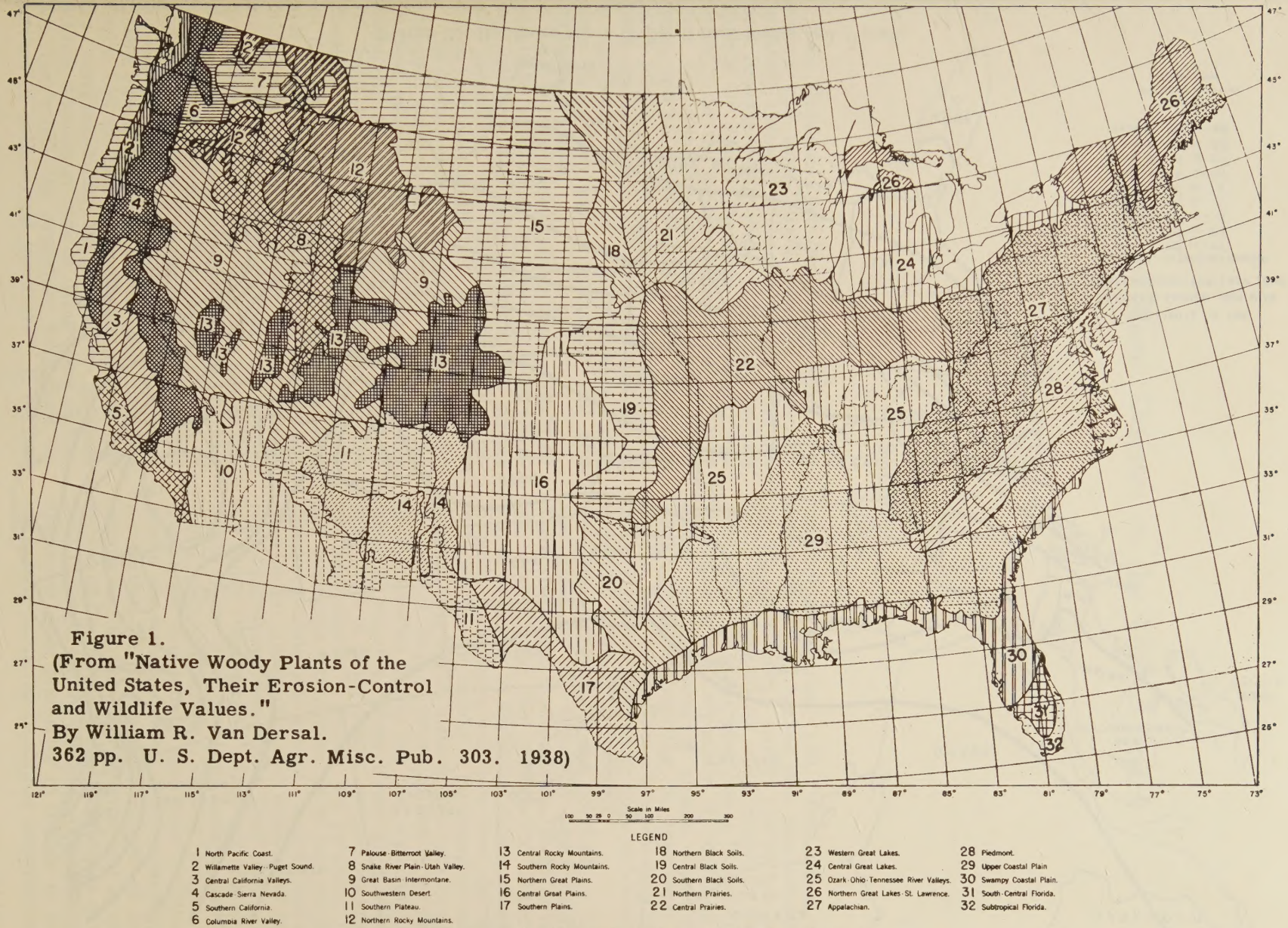

FIGURE 1.—Plant growth regions of the United States.

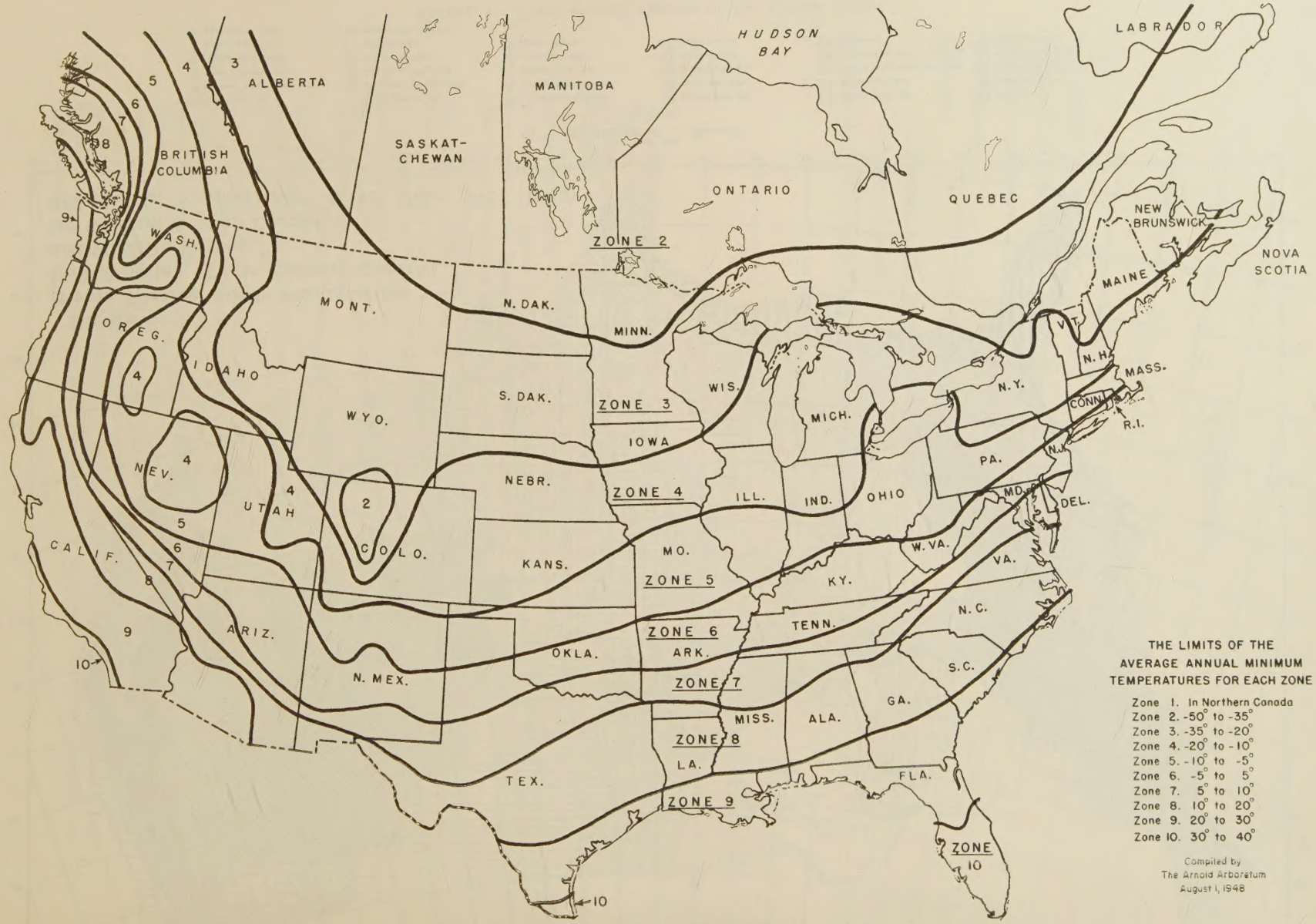

FIGURE 2.—Hardiness zones of the United States and Canada.

Index of Plant Diseases in the United States

SCOPE

This Handbook lists more than 1,200 host genera and some 50,000 parasitic and nonparasitic diseases. The scope of this index has been broadened with respect to the number and variety of plants that are considered "economic." In the earlier "Check List" of 1926 very few noncultivated plants, except forest trees, and no weeds were admitted. Yet many such plants possess economic importance for some special reason. Even weeds may occupy a significant place in a plant-disease index, since they often harbor pathogens that also infect crop plants.

As it is important to obtain disease-resistant plants by selection or by breeding from resistant relatives, the index indicates the species and sometimes the varietal relationships between host and parasite.

The inclusiveness of the present list has been extended not only with respect to the number of host plants represented but also by less selectivity among the associated organisms on the basis of disease-producing capacity. The simplest way to make an index satisfactory to all prospective users is to include every available record, but difficulties mount as more and more selection is practiced. For example, among the wood-inhabiting fungi, it is easy to list all species (assuming that they can be distinguished and are properly identified) that have been reported upon a particular kind of substrate. Similar nonselective lists, repeated for each kind of host, would result in impracticable bulk in an index. On the other hand, the Check List of 1926 attempted to include only the wood-inhabiting fungi "known to cause definite diseases or rots of living trees or timber, for which the symptoms have been described in pathological literature." It omitted "saprophytic species" and "those whose economic importance has not been demonstrated." In this Handbook a middle course has been followed, in which all wood-inhabiting fungi are included that are described in literature as producing a rot, especially if occurring on trunks and branches of sizable dimensions. Thus, fungi contributing to the decay of stumps, logs, and slash and those causing heart or sapwood rots of standing trees and decay of structural timbers are included.

A major problem in the selection of items was posed by the numerous bark-inhabiting Ascomycetes and Coelomycetes. Many of them are, respectively, the perfect and imperfect stages belonging to single life cycles, of which either or both phases may have been identified. Some are known, usually in the imperfect stage, to cause twig blight, dieback, and canker; often the perfect stage is produced only after death of the affected parts, but the organism as a whole is parasitic. Many others grow only on dead parts of living plants and are designated as "perthophytes"; though not parasitic, they are sometimes pathogenic. Most lists of plant diseases include both groups. A third and perhaps larger group of leaf–, stem–, and twig-inhabiting fungi develop on dead plants, and are called "necrophytes"; they are usually excluded from lists of plant diseases and are found only in inclusive lists of fungi. The boundaries separating the three nutritional groups are tenuous at best. Furthermore, representatives of two and sometimes all three groups may be found on the same leaf or stem. As one of the purposes of such an index as this is to facilitate the identification of pathological specimens, it is preferable to include as many organisms occurring in similar associations as

space limits permit, and to distinguish them by annotations as to pathogenicity or other characters. Thus, parasitic organisms are differentiated by giving a general or specific name of a disease that they may cause, and perthophytes by noncommittal expressions such as "on leaves" and "on stems." Necrophytes can be further distinguished by specifying dead leaves, stems, or other parts, but present information is not sufficient to make these distinctions in all cases.

For example, on *Malus sylvestris* (apple), we may have *Nummularia discreta*, blister canker; *Valsa leucostoma*, on twigs and branches, canker; and *Daldinia concentrica*, on dead wood.

In addition to the organisms that are parasitic or pathogenic on living plants, account must be taken of those causing spoilage or deterioration of agricultural produce and certain byproducts. The fungi that cause decay of structural timber and the fungi and other organisms that are responsible for spoilage of fruits and vegetables in commerce are usually accorded recognition in any list of plant diseases. However, those causing wood stain (without decay) of logs and various forms of fiber deterioration usually are omitted. Although phytopathology may justifiably restrict its field to the ailments of growing plants and their primary products, industrial mycology must take account of the effects of fungi on some manufactured products. Without attempting to extend this index into such areas as the deterioration of textiles and other manufactured plant products, the organisms associated with fiber deterioration—for example, in cotton and hemp—may properly be included.

NOMENCLATURE

In accordance with the policy of the U.S. Department of Agriculture, the scientific names of host plants and associated organisms in the Handbook are in general those sanctioned under the International Rules of Botanical Nomenclature. In resolving questions of nomenclature pertaining to host species, Bailey's "Hortus," "Standardized Plant Names," Rehder's "Manual of Cultivated Trees and Shrubs." and "Index Kewensis" have been the standard guides. Controversial matters were referred to the botanical specialists of the Department. Common names, where given, are mainly from "Hortus" and the "Standardized Plant Names" or from regional floras.

A wholly consistent application of the Rules of Nomenclature to fungi is not at present feasible. For example, for the rust fungi the nomenclature of Arthur's "Manual of the Rusts in United States and Canada" has been followed, though it deviates from the Rules in matters affecting a few names. The nomenclature of the downy mildews conforms to the rule giving priority to the specific name first applied to the perfect stage, although in a few instances this results in the displacement of familiar names, which are, however, also given. How to apply the Rules of Nomenclature to some of the powdery mildews, *Microsphaera alni* for example, has not been satisfactorily determined, but certain names, equivalent in usage to *nomina conservanda*, have gained wide acceptance. Several fungi that are commonly found in nature only in the mycelial or sclerotial state, though possessing known Basidiomycetous fructifications (e. g., *Rhizoctonia solani*, *R. crocorum*, and *Sclerotium rolfsii*), are ordinarily listed here under the cited names, since the production of the perfect stage is rare or unknown in nature and may require special technique in culture. *Sclerotium bataticola* is usually listed under *Macrophomina phaseoli*, its pycnidial state, since this is readily produced in culture.

The pleomorphic Ascomycetes are usually listed under the perfect-stage name, but a cross reference from the name of the often more familiar conidial stage is given wherever this is thought to be helpful.

In the nomenclature of certain Hymenomycetous genera having a large number and variety of species, as *Polyporus*, *Poria*, and *Fomes*, a conservative disposition has been followed for the most part in retaining these generic names. although several authorities have proposed ways of subdividing them. There is no comprehensive and generally accepted treatment of all species in our range, however. The genera segregated from *Hydnum* are accepted here because authorities appear to be in closer agreement on its subdivision than they are on *Polyporus*.

The names employed for bacteria conform generally to those in the sixth edition (1948) of "Bergey's Manual of Determinative Bacteriology," and are arranged in alphabetical order among the scientific names of other organisms. As there has been thus far no general agreement upon a scientific nomenclature for viruses, they are here designated by the name most commonly applied to the associated disease, followed by the name of virus, according to the binomial system of nomenclature as given in Supplement No. 2 of Bergey's Manual. For the convenience of those favoring K. M. Smith's numerical designation, the corresponding name in this system is also given.

Diseases of unknown cause that have distinc-

tive names and those attributed to nutritional deficiencies and other specific physiological factors are listed under the names by which they are commonly reported. Physiological diseases of wholly nonspecific character, such as those caused by high or low temperature or drought, are not listed unless they are especially frequent in certain plants (as leaf scorch in maples used as street trees) or produce distinctive effects.

Virus and physiological diseases and those of unknown cause are grouped at the end of the list of scientific names of organisms.

Common or descriptive names of plant diseases have not been standardized in the United States as has been attempted in England by a semiofficial committee, which has issued a "List of Common British Plant Diseases." However, certain names that have long been familiar and distinctive are listed.

GEOGRAPHIC DISTRIBUTION

The designation of the geographic range of the various diseases and pathogens, in so far as the available reports afford information, follows nearly the same plan as that adopted in Department Bulletin 1366. Thus, the designation "general" means that the disease or pathogen is coextensive with host; "widespread" means that the disease or pathogen is reported from many scattered points, too numerous to list separately, but with some gaps in continuity that preclude the designation "general." These terms are sometimes modified by the addition of words such as "frequent" or "occasional," to denote intensity as well as range of occurrence. All these terms must be considered in relation to the range, in nature or in cultivation, of the host plant, but whereas Department Bulletin 1366 made no mention of host distribution, this information is now provided.

Since an undoubtedly influential factor in the occurrence of certain types of disease is the climatic adaptation, or lack of it, of the host, it seems important to indicate where the host grows naturally or is successfully cultivated. For woody plants, the Plant Growth Regions of the United States as designated by Mulford in Van Dersal's "Native Woody Plants of the United States" have been used (fig. 1). For cultivated plants, where temperature is the predominant factor affecting the geographic range, the Hardiness Zones as mapped by the Arnold Arboretum and adapted from Wyman's "Shrubs and Vines for American Gardens" have been used (fig. 2).

Certain regional designations employed most frequently are explained in the following list. The original source of some records reported distribution by areas not conforming to this list and without further information; in such cases the distribution is given as in the original source. When the reported range covers an indefinite area comprising more States than it is practicable to list separately but not coinciding with any one or more of the regional designations, a general circumscribed area is given, usually proceeding from northeast to southeast, southwest, and northwest. Sometimes, however, the direction is from north to south on the east, then north to south on the west; and there are other variations. It should not be inferred that reports of the disease have been made from every State in the circumscribed area, but available information indicates that it is likely to be found anywhere within or adjacent to such an area. When reported distribution is less extensive the States are listed alphabetically, sometimes in more than one sequence if records indicate definite gaps in distribution between widely separated regions.

GEOGRAPHIC REGIONS [1]

Eastern States or The East
- New England States: Connecticut (Conn.), Maine, Massachusetts (Mass.), New Hampshire (N.H.), Rhode Island (R.I.), and Vermont (Vt.).
- Northeastern States: New England and Delaware (Del.), New Jersey (N.J.), New York (N.Y.), and Pennsylvania (Pa.).
- Middle Atlantic States: Delaware, Maryland (Md.), New Jersey, and Virginia (Va.).
- Southeastern States: Florida (Fla.), Georgia (Ga.), North Carolina (N.C.), and South Carolina (S.C.).

Central States
- North Central States: Illinois (Ill.), Indiana (Ind.), Iowa, Michigan (Mich.), Minnesota (Minn.), Missouri (Mo.), Ohio, and Wisconsin (Wis.).
- South Central States: Alabama (Ala.), Arkansas (Ark.), Kentucky (Ky.), Louisiana (La.), Mississippi (Miss.), and Tennessee (Tenn.).
- Special areas:
  - Great Lakes States: Mich., Minn., Wis.
  - Upper Mississippi Valley: Ill., Iowa, Minn., Mo., and Wis.
  - Lower Mississippi Valley: Ark., La., and Miss.

[1] These regions do not always conform to the regional designations given by the U.S. Census Bureau.

Corn Belt: Ill., Ind., Iowa, Mo., and Ohio.
Spring-wheat area: Minn., North Dakota (N. Dak.), and South Dakota (S. Dak.).
Western States or The West
Great Plains States:
Northern: Nebraska (Nebr.), North Dakota, and South Dakota.
Southern: Kansas (Kans.), Oklahoma (Okla.), and Texas (Tex.).
Rocky Mountain States:
Northern: Idaho, Montana (Mont.), and Wyoming (Wyo.)
Southern: Arizona (Ariz.), Colorado (Colo.), Nevada (Nev.), New Mexico (N. Mex.), and Utah.
Pacific Coast States:
Northern: Oregon (Oreg.) and Washington (Wash.)
Southern: California (Calif.).
Special areas:
Pacific Northwest: Idaho, Oreg., and Wash.
Southwestern States or The Southwest: Ariz., southern Calif., and N. Mex.
Northern States or The North
The Northeastern, North Central, northern Rocky Mountain, and northern Pacific Coast States.
Special area:
Northern Border States, or the Far North: Idaho, Maine, Mich., Minn., Mont., N. Dak., N.H., N.Y., Vt., Wash., and Wis.
Southern States or The South
Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, and Texas.
Special areas:
Gulf States: Ala., Fla., La., Miss., and Tex.
Cotton Belt: Ala., Ga., La., Miss., N.C., S.C., and Tex.
Far South: Fla., La., and Tex.
Middle West
Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.
Other areas from which disease reports are given include:
Alaska, Canada, Canal Zone (C.Z.), Costa Rica, Dominican Republic, Haiti, Honduras, Mexico, Nicaragua, Panama, Puerto Rico (P.R.), Territory of Hawaii (T.H.),[1a] Virgin Islands (V.I.), and West Indies.

[1a] This Handbook was submitted for publication before Hawaii was admitted as a State. Changes have not been made in the publication.

PLANT DISEASES[2]

ACANTHACEAE

Beloperone

B. californica Benth., chuperosa.
Low shrub of deserts in the Southwest, sometimes planted for ornament. The more familiar *B. guttata* Brandegee, the shrimp-plant of floriculture, has not yet appeared in American mycological records.
Uromyces ruelliae Holw. (O, I, II, III), rust. Ariz., Calif., Nev.

Dianthera, waterwillow

(1) *D. americana* L.
(2) Other species.
Perennial herbs of aquatic or marshy habitats: (1) In the Southern States; others in tropical America.
Cercospora diantherae Ell. & Kell., leaf spot. Md. to Kans. and Tex. (1).
Dimerosporium langloisii Ell. & Martin, black mildew. La., Miss. (2).
Dothideovalsa diantherae (I. M. Lewis) Th. & Syd., black knot. Tex. (1).
Guignardia justiciae F. L. Stevens, on leaves. C.Z. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).

[2] Arranged alphabetically according to scientific names of (1) host family, (2) host genera, and (3) disease organism; (*) means that the disease occurs on all species listed.

Dyschoriste

D. oblongifolia (Michx.) Kuntze
Perennial herb of pine barrens in the Southeastern States, sometimes planted for ornament.
Aecidium tracyanum Syd. (O,I), rust. Fla.

Eranthemum

E. nervosum R. Br.
Woody herb of tropical Asia, grown for ornament.
Phyllosticta sp., leaf spot. N.J.

Graptophyllum

G. pictum (L.) Griff.
Shrub of southwestern Pacific, grown for ornament under glass and in tropical America.
Gloeosporium sp., anthracnose. P.R.
Rosellinia bunodes (Berk. & Br.) Sacc., root rot. P.R.

Ruellia

(1) *R. ciliosa* Pursh
(2) *R. nudiflora* (Engelm. & Gray) Urban.
(3) *R. strepens* L.
(4) *R. tuberosa* L.
(5) Other species.

Perennial herbs of open woods and plains: (1) and (3) in Middle Atlantic to Gulf States, (2) and (4) in Southern States; sometimes planted for ornament, useful to wildlife.

Cercospora consociata Wint., leaf spot. Ala., Ill., Miss., Mo. (1); Iowa (5).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (5).
Puccinia ruelliae (Berk. & Br.) Lagh. (O, I, II, III), rust. Md. to Fla., Tex., and Kans. (1,3); Tex. (2,4,5); Mo. (5).
Uromyces ruelliae Holw. (O, I, II, III), rust. Tex. (5).

Sanchezia

S. nobilis Hook. f.

South American shrub, grown for ornament in the Far South.

Clitocybe tabescens (Scop. ex Fr.) Bres., mushroom root rot. Fla.

Thunbergia, clockvine

(1) *T. fragrans* Roxb.
(2) *T. grandiflora* Roxb.
(3) *T. laurifolia* Lindl.

Ornamental woody vines of India, grown for ornament and ground cover in the open in Florida and tropical America; also in greenhouses.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Fla. (2,3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla. (1,2,3).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M. Sm.). N.Y. (on *T. alata* Bojer).

ACERACEAE

Acer, maple

I. Native Species, Eastern and Central States, Large Trees

(1) *Acer negundo* L., boxelder. Range 17,18, 19,20,21,22,23,24,25,26,27,28,29,30.
(2) *A. nigrum* Michx. f., black maple. Range 21,22,24,25,26,27,28,29.
(3) *A. rubrum* L., red maple; including *A. rubrum drummondii* (Hook. & Arn.) Sarg., Drummond maple, and *A. rubrum trilobum* K. Koch, trident maple. Range 19,20,21,22, 23,24,25,27,28,29,30.
(4) *A. saccharinum* L., silver maple or soft maple. Range 18,19,20,21,22,23,24,25,26,27, 28,29,30.
(5) *A. saccharophorum* K. Koch (*A. saccharum* Marsh.), sugar maple, hard maple. Range 15,18,21,22,23,24,25,26,27,28,29.

Actinopelte dryina (Sacc.) Hoehn., leaf spot. Ill. (5).
Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Tex. (4); Mich., Okla.
Aleurodiscus acerinus (Pers. ex Fr.) Hoehn. & Litsch., bark patch. Mass., Vt.
Alternaria sp. (*Macrosporium negundinicola* Ell. & Ev.), leaf spot (?secondary). Kans. (1).
Armillaria mellea Vahl ex Fr., root rot. General, especially (5), frequent (2,3,4), in the Northeastern and North Central States.
Ascochyta: SEE *Septoria aceris* to which *A. aceris* Lib. is referred. *A. negundinis* Tehon—Ill. (1) may also belong to this species; it is antedated by *A. negundinis* Bres.
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches. Ga. (4), N.Y.
Ceratostomella echinella Ell. & Ev., on dead bark. N.J., Ohio.
Cercospora negundinis Ell. & Ev., leaf spot. Nebr., Wis., ?Kans. (1).
Ciboria acerina Whet. & Buchw., inflorescence blight. Mass. (3), N.Y. (3,4).
Chlorosplenium aeruginosum (Oed. ex Fr.) de N., green stain. Maine, Vt.; probably cosmopolitan (5).
Cladosporium humile J. J. Davis: SEE *Venturia acerina.*
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Mo. (4).
Collybia velutipes W. Curt. ex Fr., wound rot. Conn., Mass. (5).
Coniothyrium negundinis Tehon & Daniels, twig canker. Ill., Okla. (1).
Coryneum negundinis Berk. & Curt., on twigs, ?dieback. Maine (1), N.Y. (5).
C. septosporioides Sacc. & Syd.—Colo., Wyo. (1).
Crepidopus herbarum Pk., ?wound rot. N.C.
Cristulariella depraedens (Cke.) Hoehn., leaf spot. Conn. (3,4,5).
C. pyramidalis Waterman & Marshall—Conn. (1); N.Y., Pa. (5).
Cryptodiaporthe magnispora (Ell. & Ev.) Wehm., on branches. N.J.
C. myinda (Cke. & Ell.) Wehm.—Ga. (3).
Cuscuta gronovii Willd., dodder (on seedlings). N.Y. (3).
Cylindrosporium: SEE *Septoria aceris* (*Phleospora aceris*) to which *C. acerinum* Tracy & Earle, *C. negundinis* Ell. & Ev., and *C. saccharinum* Ell. & Ev. are referred.
Cytospora spp. Conidial stage of *Valsa* spp. Present on necrotic parts, probably mostly saprobic, but canker or dieback sometimes ascribed. *C. annulata* Ell. & Ev.—Nebr., S. Dak. (1); *C. chrysosperma* Pers. ex Fr. (=*Valsa sordida* Nits.)—Maine to Kans. and Minn. (3,4); *C. negundinis* Ell. & Ev.—Colo., Kans., Mich., S. Dak. (1); *Cytospora* sp., trunk canker following tapping injury. Vt. (5).
Daedalea spp., wound rot of living trees, sapwood rot of logs; especially *D. confragosa* Bolt. ex Fr. and *D. unicolor* Bull. ex Fr.—Northeastern and North Central States and southward (*).
D. quercina L. ex Fr.—Conn. (3), Vt. (4).
Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., sapwood rot, root and butt rot. Cosmopolitan, especially on (3) from Maine to Va. and Mich.; also Va. (1,4). *D. vernicosa* (Schw.) Ces. & de N. —Md., Mo. (3).
Dermea acerina (Pk.) Rehm (*Sphaeronema acerinum* Pk.), on branches. Ga., Maine, Mich., N.H., N.J., N.Y., Pa., Va. (3); N.Y. (4,5).
Diaporthe dubia Nits., on branches, Mich., Mo., N.H., N.Y., Ohio, Vt. (4,5).
D. eres Nits.—Iowa (4).
?D. acerina (Pk.) Sacc.—Iowa (4).
Diatrype hochelage Ell. & Ev., bark canker (?second-

ary). N.Y. (4), Minn. (5). Other species on decaying wood.

Diplodia acericola Tehon & Stout, on twigs. Ill. (5).

D. atrata (Desm.) Sacc. (=*D. subtecta?*)—Nebr., W. Va. (1).

D. subtecta Fr.—Mich.

Endoconidiophora virescens Davidson, sap streak. N.C. (5).

Endothia parasitica (Murr.) P. J. and H. W. Anderson, on dead branches. ?Va. (3).

Eutypella parasitica Davidson & Lorenz, trunk canker. Mich., Minn., N.H., N.Y., Vt., Wis. (3,5). Various other species reported on *Acer*, as *E. constellata* (Berk. & Curt) Ell. & Ev., *E. corynostoma* (Berk. & Rav.) Sacc., *E. rugiella* (Cke. & Ell.) Sacc., and others are probably saprobic.

Fomes. (a) Species causing heart rot or butt rot of living trees: *F. applanatus* (Pers. ex Wallr.) Gill. —general (*); *F. connatus* (Weinm. ex Fr.) Gill. —Northeastern States to Fla. and Minn., especially (3,5); *F. igniarius* (L. ex Fr.) Kickx—general, especially (3,5). (b) Species causing decay of dead trunks and logs: *F. fomentarius* (L. ex Fr.) Kickx—Northeastern and North Central States (*) especially (5); *F. subroseus* (Weir) Overh.—Md. (3); *F. ulmarius* (Sow. ex Fr.) Cke.—Gulf States (3). (c) Other species reported: *F. australis* Cke. — Fla. (3); *F. fraxineus* (Bull. ex Fr.) Cke.—N.Y. (1,5); *F. fraxinophilus* (Pk.) Sacc.—Oreg., Wyo. (1), Conn., Miss. (3); *F. marmoratus* (Berk. & Curt.) Cke.—Fla. (on *A. floridanus*); *F. pinicola* (Sw. ex Fr.) Cke.—N.Y. (5); *F. scutellatus* (Schw.) Cke.—N. Dak. (1), Maine, Va. (3).

Fusarium reticulatum Mont. var *negundinis* (Sherb.) Wr., red stain. General (1).

Ganoderma spp., white spongy butt rot: *G. curtisii* (Berk.) Murr.—Fla., N.J. (3); *G. lucidum* (Leyss. ex Fr.) Karst.—Md. (3); *G. sessile* Murr.—Md., N.Y., Pa. (3); Conn. (5).

Gloeodes pomigena (Schw.) Colby, on twigs. Ind. (5).

Gloeosporium spp., leaf spot, anthracnose, leaf blight. Identifications and nomenclature greatly confused, but a small leaf-spot group and a large leaf-spot, or blotch, group are usually distinguished. The former is typified by *G. acerinum* West. (*Septogloeum acerinum* (Pass.) Sacc.), now referred to *Septoria* (*Phleospora*) *aceris*. The latter group is usually referred to *G. apocryptum* Ell. & Ev., or the perhaps synonymous *G. saccharinum* Ell. & Ev.; but *G. aceris* Cke., if identical, has priority. Some of the material so reported, and also some identified as *G. decolorans* Ell. & Ev., properly belongs to *Taphrina* spp. *G. hysterioideum* Dearn. & Barth. and *G. negundinis* Ell. & Ev. are invalid names.

G. aceris Cke., leaf spot, leaf blight. Mich., N.C., N.Y., S.C. (3); Mo. (4).

G. apocryptum Ell. & Ev., anthracnose, leaf blight. Pa. to Tex. and Minn. (1); Md., Mich., N.J. (3); Maine to N.C. and Minn. (5). *G. apocryptum* var. *ramicola* Ell. & Ev., on twigs. N.J., Tex. (1).

G. saccharinum Ell. & Ev., leaf blight. Conn., Ill., Iowa, Wis. (4); Conn., Maine, Wis., also (?) Ind., N.Y., Ohio (5).

Gnomonia sp., on fallen leaves. Ga., Mich. (5).

Gnomoniella tenella (Ell. & Ev.) Sacc., on fallen leaves. Ga. (3,5); N.C., N.J. (3).

Haplosporella clintonii (Pk.) Petr. & Syd., *H. negundinis* Ell. & Barth.: SEE *Sphaeropsis albescens*.

Hendersonia collapsa Cke. & Ell., on twigs. Mich. (1), W. Va. (3,4), Ind. (4).

Hericium erinaceus (Bull. ex Fr.) Pers., wood rot, sometimes heart rot of living trees. Kans., Md., N.J. (4); Vt. to Md., Mich., and Minn. (2,5).

H. coralloides (Scop. ex Fr.) S. F. Gray, wood rot. Cosmopolitan (*).

Hydnum: SEE *Hericium* and *Steccherinum*.

Hymenochaete agglutinans Ell., bark canker, sometimes girdling saplings. Conn., Md., Mich. (3). Other species, such as *H. badio-ferruginea* (Mont.) Lév., *H. corrugata* (Fr.) Lév., and *H. tabacina* (Sow. ex Fr.) Lév., widely distributed on dead branches and wood (*).

Hypoxylon morsei Berk. & Curt., trunk canker. Mich., Minn. (3,5). Numerous other species on decaying wood (*).

Laestadia brunnea (Berk. & Curt.) Sacc., leaf spot. N.C., S.C. (3). Perhaps connected with *Phyllosticta minima*. *L. glaucescens* (Cke.) Sacc.—S.C. (3). Also reported as *Sphaerella brunnea* (Berk. & Curt.) Cke. and *S. glaucescens* Cke., respectively.

Lenzites betulina L. ex Fr. and *L. trabea* Pers. ex Fr., wood decay. Northeastern and North Central States (*), especially (3).

Leptothyrium acerinum (G. Kunze ex Fr.) Cda., leaf spot. Okla. (5).

L. maximum Tehon & Daniels, on twigs. Ill. (1).

Libertella sp. (*?L. acerina* West.), bark canker (?secondary). Va., W.Va. (3,4). Probably the conidial stage of *Diatrype* or *Eutypella* sp.

Lophodermium punctiforme (Fr.) Fckl., on fallen leaves. N.Y. (4).

Macrophoma sp., twig blight. Ark., N.Y.

M. negundinis Ell. & Ev. (=*Diplodia subtecta?*), on twigs. Colo. (1). Also as leaf spot—Okla. (1). SEE ALSO *Physalospora* and *Sphaeropsis*.

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot of seedlings. Ill. (4).

Marssonina: SEE *Septoria aceris* to which *M. acerina* of American authors is referred. In Europe *M. acerina* (Bres.) Grove = *M. truncatula* Magn. or *M. tulasnei* (Sacc.) Died. A leaf spot attributed to *M. castagnei* (Desm. & Mont.) Magn. is reported in Oreg. (4).

Melanconis spp., on dead branches: *M. appendiculata* (Otth) Wehm. — Ga. (3). *M. everhartii* Ell. — Kans., Mass., Pa. (3,4). *M. sudans* (Berk. & Curt.) Wehm.—Ga., Mass., Mich., N.J., N.Y., S.C. (3,4).

Microdiplodia subtecta Allesch., on twigs. N.Y. (4).

Microthyriella rubi Baines, on twigs. Ind. (5).

Monochaetia desmazierii Sacc., leaf spot. Ga., N.C., Okla., Tenn. (3).

Mycosphaerella sp., on fallen leaves. Ga. (5).

M. septorioides (Desm.) Lindau—N.Y. (5).

M. punctiformis (Pers. ex Fr.) Schroet.—Ga., N.Y. (5).

Myxosporium acerinum Pk., on twigs. Nebr. (1); Ill., Wis. (4). SEE ALSO *Melanconis*.

Nectria cinnabarina Tode ex Fr., dieback, secondary canker. Northeastern and North Central States (*), also to Ala. and N. Dak. (1), to Ga. (4).

N. coccinea Pers. ex Fr., on trunks and larger branches. New England and N.Y. (3,5).

N. galligena Bres., trunk canker. Northeastern and Great Lakes States (3,5).

Pezicula acericola (Pk.) Sacc., on branches. Maine, Vt. (5).

P. carnea (Cke. & Ell.) Rehm—Ga., Md., N.H., N.J., N.Y., Pa. (3).

Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot. N.C., Va. (3); N.Y. (5).

Phacidium negundinis Tehon & Daniels, on branches. Ill. (1).

Phleospora aceris (Lib.) Sacc. = *Septoria aceris*, but is preferred by some authors as a more fitting name; it causes the common small leaf spot (*).

Pholiota adiposa Fr., root and butt rot. Mont. (1); Del., Md. (4); Mass., N.H., R.I., Vt. (5).

P. squarrosoides Pk.—N.Y.

Phoma negundinicola Thuem., also var. *ramicola* Ell. & Ev., on twigs. Iowa, N.J., W. Va. (1).

Phomopsis sp., trunk canker (?secondary). Ohio (5). SEE ALSO *Diaporthe* and *Cryptodiaporthe.*

Phoradendron flavescens (Pursh) Nutt., mistletoe. Common on (3) from N.J. to Fla., Tex., and Mo. Ind. (4,5).

Phyllactinia corylea Pers. ex Karst., powdery mildew. S. Dak. (1); N.C., Wis. (4); Iowa, Vt. (5).

Phyllosticta minima (Berk. & Curt.) Ell. & Ev., purple-bordered leaf spot, eyespot. General (*). *P. acericola* Cke. & Ell. and probably *P. saccharina* Ell. & Martin are synonymous.

P. hesleri Dearn.—Tenn. (5).

P. minutissima Ell. & Ev.: Probably a growth stage of *Septoria aceris.*

P. negundinis Sacc. & Speg., leaf spot. Maine to Ala., Tex., and Wis. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,4,5).

Physalospora abdita (Berk. & Curt.) N. E. Stevens, on branches, ?dieback. Fla., Ga., S.C. (3). *P. obtusa* (Schw.) Cke. (*Sphaeropsis negundinis* Tehon & Daniels, *?S. albescens* Ell. & Ev.)—Ga., Ill., Iowa, Md., Okla., Pa., Tenn., Va. (1); Ga., Md., Va. (3); Ind. (4).

Phytophthora cactorum (Leb. & Cohn) Schroet., bleeding canker. Mass., N.J., R.I. (2,3,5).

Piggotia negundinis Ell. & Dearn., leaf blotch. Wis., Wyo. (1).

Pleurotus spp., wound rot, sapwood rot: *P. ostreatus* Jacq. ex Fr.—Eastern and Central States (*); *P. sapidus* Kalchbr.—Conn., Mass. (5); *P. ulmarius* Fr.—Colo., Iowa, Kans. (1); Conn., N.C. (3).

Polyporus. (a) Species causing heart, or butt, rot of living trees: *P. compactus* Overh.—Mich. (2); *P. frondosus* Dicks. ex Fr.—Iowa (2); *P. fumosus* Pers. ex Fr.—Md. (3); *P. glomeratus* Pk.—Mont. (1); Mich., Minn., N.Y., Ohio, Vt. (3,5); *P. hispidus* Bull. ex Fr.—Ind., Pa. (3,5); *P. obtusus* Berk.—Mich. (2), Md. (4); *P. spraguei* Berk. & Curt.—Mich. (2); *P. squamosus* Huds. ex Fr.—Northeastern and North Central States (1,5); *P. sulphureus* Bull. ex Fr.—Northeastern and North Central States (2,3,5). (b) Species causing decay of dead trees, logs, or timber; distribution cosmopolitan unless otherwise noted: *P. adustus* Willd. ex Fr. (*); *P. brumalis* Pers. ex Fr. (*); *P. cuticularis* Bull. ex Fr. (*); *P. delectans* Pk.—N.Y.; *P. dichrous* Fr. (*); *P. distortus* (Schw.) Fr.—Mont. (1); *P. durescens* Overh.—Miss., Ohio (4); *P. gilvus* (Schw.) Fr. (*); *P. hirsutus* Wulf. ex Fr. (*); *P. hispidus* Bull. ex Fr. (*); *P. pargamenus* Fr. (*); *P. tulipiferus* (Schw.) Overh. (*); *P. versicolor* L. ex Fr. (*).

Poria spp., wood rot, usually on much decayed logs, stumps, or timber. Numerous species, widespread; among the more common noted on *Acer* are: *P. ambigua* Bres., *P. ferruginosa* (Schrad. ex Fr.) Karst., *P. eupora* (Karst.) Cke., *P. isabellina* (Fr.) Overh., *P. pulchella* (Schw.) Cke., *P. punctata* Fr., *P. unita* (Pers.) Cke., *P. versipora* (Pers.) Rom.

Pyrenopeziza leucodermis Cash, on fallen leaves. Ga. (3).

Ramularia lethalis Ell. & Ev., secondary leaf spot, associated with *Taphrina dearnessii.* N.Y., Wis. (3).

Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot. Tex. (1).

R. solani Kuehn, damping-off. Cosmopolitan.

Rhytisma acerinum Pers. ex Fr., tar spot. General (3,4,5).

R. punctatum Pers. ex Fr., small tar spot, speckled leaf spot. N.Y. (1); W. Va. (2); Pa. (3); Ind., N.C., Wis. (4); Ind., Pa., Va. (5).

Schizophyllum commune Fr., wood rot, usually of dead trees or timber, sometimes dead parts of living trees. Cosmopolitan.

Schizoxylon microsporum Davidson & Lorenz, trunk canker. Mich., Minn., Wis. (3,5).

Septobasidium spp., brown felt (parasitic on scale insects): *S. castaneum* Burt—Fla. (3); *S. cokeri* Couch — N.C. (1); *S. fumigatum* Burt — Ala., Fla., La., N.C., S.C., Va. (3); *S. pseudopedicellatum* Burt—Fla. (1,3), Ky. (4,5), Tenn.

Septogloeum acerinum (Pass.) Sacc.: SEE FOLLOWING.

Septoria aceris (Lib.) Berk. & Br. (*S. acerina* Pk., *S. saccharina* Ell. & Ev., and numerous other synonyms), leaf spot. General (*). Said to be the pycnidial stage of *Mycosphaerella latebrosa* (Cke.) Schroet. SEE ALSO *Phleospora aceris. S. salliae* Gerard—Iowa, N.Y. (4).

Sphaerognomonia carpinea (Fr.) Poteb., on fallen leaves. Ga. (3).

Sphaeronema spp., on twigs and branches: *S. acerinum* Pk. is the conidial stage of *Dermea acerina. S. canum* Ell. & Ev. (*S. negundinis* Ell. & Ev.)—Kans., Pa. (1).

Sphaeropsis albescens Ell. & Ev., dieback. Iowa, Kans., N. Dak., S. Dak., Wis. (1); N.Y. (3); Ill. (4,5). *S. clintonii* Pk. (*Haplosporella clintonii* (Pk.) Petr. & Syd.) may be an earlier name. SEE ALSO *Physalospora.*

Steccherinum septentrionale (Fr.) Banker, white spongy sapwood rot, sometimes on living trees. General (3,4,5).

S. ochraceum (Pers. ex Fr.) S. F. Gray—Md., N.H., Va. (3).

S. pulcherrimum (Berk. & Curt.) Banker—Ohio.

Steganosporium spp., on dead branches: *S. pyriforme* (Hoffm. ex Fr.) Cda., as reported on *Acer,* may be the conidial stage of *Massaria pupula* (Fr.) Tul., a cosmopolitan saprophyte, or of *Melanconis* spp. *S. acerinum* Pk. is perhaps the same.

Stereum spp., wood rot, chiefly of slash, also on logs and stumps, sometimes heart rot of living trees; the following frequently reported on *Acer*: *S. fasciatum* Schw. (*); *S. fuscum* (Schrad. ex. Fr.) Quél. (*); *S. gausapatum* Fr. — Eastern States (3,5); *S. murrayi* (Berk. & Curt.) Burt — Northeastern States (3,5); *S. purpureum* Pers. ex Fr. (*); *S. roseocarneum* (Schw.) Fr.—Pa., Tex. (*); *S. versiforme* Berk. & Curt. (*).

Stilbella acerina Overh., leaf spot (associated with *Phyllosticta acericola.* Pa. (3).

Stilbospora ovata Amer. auths., ? Pers. ex Fr., on dead branches. Probably the conidial stage of *Melanconis everhartii.*

Strumella coryneoidea Sacc. & Wint., trunk canker. Mich. (2), Pa. (3). Reported by Davidson to be the conidial stage of *Urnula craterium* (Schw.) Fr.

Taphrina carveri Jenkins, leaf blister. Ala., Ky., Mich., Mo. (4).

T. dearnessii Jenkins, black leaf blister. Ga., Mich., Minn., N.C., N.Y., Okla., Pa., Va. (3).

T. sacchari Jenkins, brown leaf blister. Ohio (2); Ark., Ga., Ind., Kans., Maine, Mich., Mo., N.H., N.Y., Ohio, Pa., Tenn., W. Va., Wis. (5).

Thelephora albido-brunnea Schw., encircling stems of seedlings or young trees. N.C., Va. (3). Other species of cosmopolitan occurrence on fallen branches.

Thyronectria pyrrochlora (Auers.) Sacc., on branches. Ga. (5).

Trametes spp., wood rot of dead trees and logs; the following frequent: *T. hispida* Bagl.; *T. mali-*

cola Berk. & Curt., *T. mollis* Sommerf. ex Fr., and *T. sepium* Berk. (*).

Uncinula circinata Cke. & Pk., powdery mildew. Ind. (2); Maine to Ala., Mo., and Mich. (3); Maine to Tex. and Iowa (4); N.H. to Mo. and Iowa (5).

Ustulina vulgaris Tul., wood rot, sometimes butt or heart rot of living trees. Northeastern and North Central States (*). According to some authors a synonym of *U. deusta* (Hoffm. ex Fr.) Petr., and also reported as *Hypoxylon deustum* (Hoffm. ex Fr.) Grev.

Valsa spp., on dead branches: *V. ambiens* Pers. ex Fr., *V. sordida* Nits., and others as reported on *Acer* are probably saprobic. SEE ALSO *Cytospora* and *Eutypella*.

Venturia acerina Plakidas (*Cladosporium humile* J. J. Davis), leaf spot. N.Y., Va., W. Va. (3); Wis. (3,4,5); Pa. (5).

Verticillium albo-atrum Reinke & Berth., wilt. Northeastern and North Central States to Va., Tenn., and Ill., especially (5), occasional (3,4).

Volvaria bombycina Schaeff. ex Fr., on decaying wood, ?sapwood or heart rot. Ark., La., Mich., N.Y., Ohio (*).

ERINEUM—proliferation of epidermal cells induced by mites (Acaridae). N.J., N.Y. (3).

MINERAL STAIN OF WOOD — cause unknown, believed physiological. Mich., Minn., Wis. (5).

ROUGH BARK — cause unknown, variously attributed to mechanical and other injuries. Northeastern and Great Lakes States (5).

II. Native Species, Eastern and Central States, Minor Trees

(1) *Acer leucoderme* Small, whitebark maple. Range 28,29.

(2) *A. pennsylvanicum* L., striped maple. Range 21,23,24,26,27.

(3) *A. spicatum* Lam., mountain maple. Range 23,24,26,27.

Botryodiplodia acerina Ell. & Ev. (*?Diplodia subtecta* Fr.), on branches, W. Va. (2).

Chlorosplenium aeruginosum (Oed. ex Fr.) de N., green wood stain. Vt. (2).

Cristulariella depraedens (Cke.) Hoehn., leaf spot. N.Y. (3).

Cryptodiaporthe densissima (Ell.) Wehm. var. *spicata* (Ell. & Ev.) Wehm., on branches. N.Y. (2,3), N.H. (3).

C. myinda (Cke. & Ell.) Wehm.—N.J., N.Y., W. Va. (3).

Cylindrosporium: SEE *Septoria*.

Daedalea confragosa Bolt. ex Fr., wood rot. Vt. (2).

Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., wood rot. Ga. (1).

Diaporthe acerina (Pk.) Sacc., on branches. Iowa, N.H., N.Y., Va. (3).

D. dubia Nits.—Ga. (1).

Didymella sphaerellula (Pk.) Sacc., on twigs. N.Y. (2).

Fomes connatus (Weinm. ex Fr.) Gill., and *F. igniarius* (L. ex Fr.) Kickx, heart rot. Northeastern States (2,3).

F. applanatus (Pers. ex Wallr.) Gill., butt rot. General (3).

Gloeosporium apocryptum Ell., anthracnose. Pa. (2). SEE ALSO *Septoria*.

Leptothyrella aceris Dearn. & House, on twigs. N.Y. (3).

Libertella acerina West., on bark, ?canker. N.Y. (2).

Myxosporium seriatum Ell. & Ev., on twigs. N.Y. (2).

Nectria cinnabarina Tode ex Fr., on twigs, ?dieback. Cosmopolitan.

N. coccinea Pers. ex Fr., on branches or trunks, secondary canker. Vt. (2).

N. galligena Bres., trunk canker. Conn., N.H., N.Y., Vt. (2,3).

Pezicula acericola (Pk.) Sacc., on branches. Pa. (2); N.H., N.Y., Va. (3).

P. subcarnea Groves—Maine (2).

Phleospora aceris (Lib.) Sacc.: SEE *Septoria*.

Phoma pennsylvanica Ell. & Ev., on twigs. W. Va. (2).

Phyllosticta minima (Berk. & Curt.) Ell. & Ev., bordered leaf spot, eyespot. N.Y., Wis. (3).

Physalospora sp. (*?P. abdita* (Berk. & Curt.) N. E. Stevens), on branches. N.C. (2).

Prosthecium stylosporum (Ell. & Ev.) Wehm., on branches. N.H., N.Y. (3).

Pyrenopeziza leucodermis Cash, on fallen leaves. Ga. (1).

Rhytisma acerinum Pers. ex Fr., tar spot. Mass., N.Y. (3).

R. punctatum Pers. ex Fr., black-speckled leaf spot. General (2,3).

Septoria aceris (Lib.) Berk. & Br., leaf spot. General (2,3). Reported under numerous synonyms in *Cylindrosporium*, *Gloeosporium*, *Phleospora*, and others.

Sphaeropsis simillima Pk. (*?S. albescens* Ell. & Ev.), on twigs. Vt. (3).

Taphrina dearnessii Jenkins, leaf blister, blotch. N.Y. (3).

T. letifera (Pk.) Sacc., leaf blight. Mass., Minn., N.C., N.Y. (3).

Uncinula circinata Cke. & Pk., powdery mildew. N.Y. (2,3); Mich., Pa. (3).

III. Native Species, Western States, Trees

(1) *Acer circinatum* Pursh, vine maple. Range 1,2,4.

(2) *A. douglasii* Hook., Douglas maple. Range 4,12.

(3) *A. glabrum* Torr., dwarf maple. Range 4,9,12,13,14,15.

(4) *A. grandidentatum* Nutt., bigtooth maple. Range 7,8,9,11,12,13,14,16,19.

(5) *A. macrophyllum* Pursh, bigleaf maple. Range 1,2,3,4,5.

(6) *A. negundo* var. *californicum* (Torr. & Gray) Sarg., California boxelder. Range 3,4,5.

Cercosporella aceris Dearn. & Barth., leaf spot. Wash. (5).

C. albo-punctata Ell. & Ev.—Oreg. (5).

Cryptodiaporthe lebiseyi (Desm.) Wehm., on branches, ?dieback. Calif. (6).

Cryptosporella acerina Wehm., on branches. Calif. (3).

Cylindrosporium spp.: SEE *Septoria*.

Cytospora chrysosperma Pers. ex Fr. (=*Valsa sordida* Nits.), dieback, twig canker. Idaho (2); Mont. (1,2,3); Wash. (3).

Daedalea unicolor Bull. ex Fr., butt and heart rot. Wash. (1); Mont. (3,4).

Daldinia grandis Child, wood rot of stumps and fallen trees. Idaho, Wash. (5).

Diplodia sarmentorum Fr., and *D. subtecta* Fr., on branches. Wash. (5).

Fomes igniarius L. ex Fr., heart rot. Idaho, Oreg., Wash. (5). Other species reported on dead wood: *F. annosus* (Fr.) Cke.—Oreg. (5); *F. fomentarius* (L. ex Fr.) Kickx—Wash. (5); *F. pinicola* (Sw. ex Fr.) Cke.—Idaho (3).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Hypholoma fasciculare Huds. ex Fr., on dead wood. Oreg. (5).

Illosporium maculicola Sacc., leaf spot. Wash. (5).

Marssonina truncatula (Sacc.) Magn., leaf spot. Oreg. (5).
Meloidogyne sp., root knot nematodes. Oreg. (5).
Microsphaera alni DC. ex Wint., powdery mildew. Oreg. (5).
Mycosphaerella sp., on leaves. Calif. (1).
Nectria cinnabarina Tode ex Fr., on twigs, ?canker. Calif., Oreg., Wash. (5).
N. galligena Bres., trunk canker. Oreg. (1,5), Wash. (5).
Phleospora aceris (Lib.) Sacc.: SEE *Septoria aceris*.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Calif., Oreg. (5).
Phyllosticta minima (Berk. & Curt.) Ell. & Ev., leaf spot. Idaho, Mo. (3).
Polyporus dryadeus Pers. ex Fr., butt rot. Oreg. (5). *P. spraguei* Berk. & Curt., heart rot. Oreg., Wash. (5). *P. squamosus* Huds. ex Fr., butt rot. Mont. (3). Other species reported on dead wood: *P. cuticularis* Bull. ex Fr.—Wash. (5); *P. hirsutus* Wulf. ex Fr., *P. versicolor* L. ex Fr.—Cosmopolitan.
Poria ferrea (Pers.) Bourd. & Galz., wood rot. Oreg. (5).
Pseudomonas aceris (Ark) Burkh., bacterial leaf spot. Calif. (1,5,6).
Rhytisma acerinum Pers. ex Fr., tar spot. Oreg., Wash. (5).
R. punctatum Pers. ex Fr., black-speckled leaf spot. Calif. (5,6); Idaho (3); Oreg. (1,3,5); Wash. (3,5).
Septoria aceris (Lib.) Berk. & Br., leaf spot. General (*). Reported as various species of *Cylindrosporium*, *Phleospora*, and *Phyllosticta*, but until the morphological distinctions are better established or physiologic specialization demonstrated, it seems better to assign them to one group. This includes *S. circinata* Ell. & Ev. on (1), *S. curvispora* Ell. & Ev. on (3), and *S. marginata* Heald & Wolf on (6). *S. crassospora* Linder—Calif. (6), is perhaps distinct.
Steccherinum ochraceum (Pers. ex Fr.) S. F. Gray, heart rot. Oreg. (1).
Stereum fuscum (Schrad. ex Fr.) Quél. and *S. hirsutum* Willd. ex Fr., on dead wood. Cosmopolitan. *S. fasciatum* Schw.—Wash. (5).
Taphrina bartholomaei Mix, leaf blister. Utah (4).
T. darkeri Mix—Oreg. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Calif., Oreg., Wash. (5).
ERINEUM—leaf deformity caused by mites (Acaridae). Oreg., Wash. (1); Utah (4).

IV. Introduced Species

(1) *Acer palmatum* Thunb., Japanese maple. Japan and Korea; cultivated for ornament, zone 5.
(2) *A. platanoides* L., Norway maple. Europe; commonly grown as a lawn and street tree, zone 3.
(3) *A. pseudoplatanus* L., sycamore maple. Europe and W. Asia; grown as a lawn and street tree, zone 5.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Mich. (3).
Armillaria mellea Vahl ex Fr., root rot. N.J., Pa. (2).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on twigs. Nebr. (3).
Cristulariella depraedens (Cke.) Hoehn., leaf spot. Conn., N.J. (1,2); W. Va. (1).
C. pyramidalis Waterman & Marshall—N.Y., Pa. (3).
Cytospora spp., on twigs, ?canker, ?dieback. Sometimes reported as *C. acerina* Aderh., perhaps mainly *C. ambiens* Sacc. (=*Valsa ambiens* Pers. ex Fr.) and *C. chrysosperma* Pers. ex Fr. (=*V. sordida* Nits.)—Conn., Mass., N.J., N.Y. (*).
Diplodia atrata (Desm.) Sacc. (=*D. subtecta* Fr.?), on twigs. Pa. (2).
Fomes connatus (Weinm. ex Fr.) Gill., heart rot. Conn. (2).
Fusarium solani (Mart.) Appel & Wr., basal canker (?secondary). N.J. (2).
Gloeosporium apocryptum Ell. & Ev., anthracnose, leaf blight. Maine to N.C., Mo., and Minn. (2). *G. saccharinum* Ell. & Ev., leaf spot. Conn. (2).
Marssonia truncatula (Sacc.) Magn., leaf spot. N.Y. (2).
Microstroma sp., frosty mildew. Ill., Ohio (2).
Myxosporium sp., twig canker. Pa. (1).
Nectria cinnabarina Tode ex Fr., dieback, twig canker (probably usually as a sequel to frost or drought injury). Northeastern States to Ohio (*).
Phleospora aceris (Lib.) Sacc.: SEE *Septoria aceris*.
Phomopsis sp. (*P. pustulata* (Sacc.) Died.?) dieback, canker (?secondary). Conn. and N.Y. to Va. (1); N.J. (2).
P. lebiseyi (Sacc.) Died., on seedlings. Iowa.
Phyllosticta minima (Berk. & Curt.) Ell. & Ev., bordered leaf spot. Conn. (1); Maine to Va. and Mo. (2); Conn., Pa. (3).
Phytophthora cactorum (Leb. & Cohn) Schroet., bleeding canker. Conn., Mass., N.J., N.Y. (2); R.I. (2,3).
P. cambivora (Petri) Buis., basal canker. N.J. (2).
Rhytisma acerinum Pers. ex Fr., tar spot. N.Y., Ohio (2).
Septoria aceris (Lib.) Berk. & Br., leaf spot. Iowa (2).
Sphaeropsis sp., twig canker, dieback. Md., N.J. (1).
S. clintonii Pk.—N.J., N.Y. (2).
Steganosporium acerinum Pk., on twigs. Mass. (3). Probably not distinct from *S. pyriforme* (Hoffm. ex Fr.) Cda., conidial stage of *Massaria pupula* (Fr.) Tul., widespread on various *Acer* spp., including (2) and (3); sometimes reported as causing dieback but probably existing only on necrotic parts.
Taphrina sp., leaf blister. Miss. (2).
Verticillium albo-atrum Reinke & Berth., wilt. General, especially (2), occasionally (1) and (3) in the Northeastern and Central States. Reports of *V. dahliae* Kleb. are included.
Xylaria mali Fromme, root rot. Va. (2).
LEAF SCORCH—physiological; often a result of frost injury, especially (1), or of heat and drought (2).

ADOXACEAE

Adoxa

A. moschatellina L., musk-root.

Perennial herb of northern alpine regions, sometimes grown in rock gardens.

Phyllosticta adoxae Clements, leaf spot. Colo.
Puccinia adoxae Hedw. f. (III), rust. Colo., Utah, Wyo.
P. argentata (Schultz) Wint. (O,I), rust. Iowa, Minn., Wis. II and III on *Impatiens* spp.
Synchytrium anomalum Schroet., leaf gall. Iowa.

AIZOACEAE

Mesembryanthemum, figmarigold

Mesembryanthemum spp.

A large and complex group of succulents of South Africa; some are grown under glass as pot plants and also in the open in California. The numerous species originally assigned to this genus have been distributed among various generic segregates but are grouped here under the general name.

Camarosporium ellipticum Cke. & Harkn., on stems. Calif.
Gibberella saubinetii (Mont.) Sacc., on stems. Calif.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Ala., Fla.
Torula herbarum Lk. ex Fr., sooty mold. Calif.

Mollugo

M. verticillata L., carpetweed.

Annual of tropical America widely distributed as a weed in cultivated ground, useful to wildlife.

Cercospora molluginis Halst., leaf spot. N.J., Tex., Wis.
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y.
Phyllosticta molluginis Ell. & Halst., leaf spot. N.J.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Rhizoctonia solani Kuehn, root rot. Tex.
Sclerotium rolfsii Sacc., southern blight. Tex.

Sesuvium

(1) *S. portulacastrum* L.
(2) *S. maritimum* (Walt.) B. S. P.

Fleshy annuals of saline soils on seacoasts and river beaches, sometimes grown in collections of succulents.

Albugo trianthemae G. W. Wils., white blister. Tex. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla. (1), Ala. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Puccinia aristidae Tracy (O, I), rust. Tex. (1). II and III on *Aristida* and *Distichlis* spp.

Tetragonia

T. expansa Thunb., New Zealand spinach.

Fleshy annual grown as a green vegetable and for stock food; locally naturalized in California.

Cercospora sp. (*?C. tetragoniae* (Speg.) Jacz.), leaf spot. Ind., Mass.
Helminthosporium sp., leaf spot. Tex.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Tex.
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif.
MOSAIC—unidentified virus. Del.
ROSETTE—unidentified virus. Ind.
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.J., N.Y.

Trianthema

T. portulacastrum L., horse-purslane.

Fleshy annual of tropical America, a weed in cultivated ground in the Southwest.

Albugo trianthemae G. W. Wils., white-rust. New Mexico.

ALISMACEAE

Alisma, waterplantain

(1) *A. plantago-aquatica* L.
(2) *A. geyeri* Torr.
(3) *A. subcordatum* Raf.

Perennial herbs of shallow water and marshes: (1) ranging throughout the Northeastern and North Central States to the Pacific coast, (2) locally in same regions as (1), (3) in the Central and Western States; important food plants for wildlife.

Cercospora alismatis Ell. & Holw., leaf spot. Del., Iowa, N. Dak., N.Y., Wis.
Cladochytrium maculare (Wallr.) J.J. Davis (*Physoderma maculare* Wallr.), leaf gall. N.Y., Wis. (1), Mont.
Didymaria alismatis (Oud.) J. J. Davis, leaf spot. Iowa, Mont., N. Dak., N.Y., Wash., Wis. (1); Iowa, N.Y. (3).
Doassansia alismatis (Nees) Cornu, leaf smut, yellow spot. N.Y. to Mo. and N. Dak.; Calif., Wash. (1); Utah (2).
Ligniera junci (Schwartz) Maire & Tyson, in roots. N.Y. (1).
Ramularia alismatis Fautr., *Septoria alismatis* Oud.: SEE *Didymaria alismatis*.

Echinodorus, burhead

(1) *E. cordifolius* (L.) Griseb.
(2) *E. radicans* (Nutt.) Engelm.

Low herbs of marshes in the Southeastern and South Central States, useful to wildlife.

Burrillia echinodori Clint., leaf smut. Calif., Tex., P.R. (1).
Cercospora sp., leaf spot. Tex. (2).
?Doassansia alismatis (Nees) Cornu, leaf smut. Fla. (1).

Lophotocarpus

L. calycinus (Engelm.) J.G.Smith

Aquatic herb of the Central and Eastern States and southward, useful to wildlife.

Doassansia sagittariae (West.) Fisch., leaf smut. Wis.

Sagittaria, arrowhead

(1) *S. latifolia* Willd.
(2) *S. cuneata* Sheldon
(3) *S. rigida* Pursh
(4) Other species.

Perennial herbs of marshes and shallow water: (1) ranging nearly throughout the United States, (2) and (3) in the Eastern and Central States, occasionally south and west; important food plants of wildlife.

Burrillia pustulata Setch., leaf smut. Ill., Nebr., Wis. (1).
Cercospora alismatis Ell. & Holw. (*C. sagittariae* Ell. & Kell.), leaf spot. Vt. to Ala., Tex., and Wis. (1); Wis. (3); Tex., P.R. (4).
Didymaria alismatis (Oud.) J. J. Davis, leaf spot. Wis. (3).
Doassansia deformans Setch., smut gall. Mass. to N.J., Mo., and S. Dak. (1); Fla., Tex. (4).
D. furva J.J. Davis, leaf smut. Wis. (3).
D. intermedia Setch., leaf smut. Iowa, Minn., N. Dak., N.H., Wis. (1).
D. obscura Setch., leaf smut. Conn., Mass. (1).
D. opaca Setch., leaf smut, blister. Mass. to Del., Ill., and Wis. (1).
D. sagittariae (West.) Fisch., leaf smut, blister. Conn. to Kans., Tex., and Mont. (1); Ind., Wis. (3); Ark., Del., Ill., Mo., Vt., Wis., Wyo. (4).
Gloeosporium confluens Ell. & Dearn., leaf spot. Iowa, Mass., Tex., Wis. (1).
Marssonina sp., leaf spot. La. (3).

AMARANTHACEAE

Acnida, waterhemp

(1) *A. cannabina* L.
(2) *A. tamariscina* (Nutt.) Wood
(3) *A. tuberculata* Moq.

Annual herbs: (1) in salt marshes on the Atlantic coast, (2) and (3) in fresh water marshes in the Central States; useful to wildlife.

Albugo bliti (Biv.-Bern.) Kuntze, white-rust. Iowa, Mich. (2); Iowa, Kans., Wis. (3).
Cercospora acnidae Ell. & Ev., leaf spot. Del. (1), Wis. (3).
Phyllosticta amaranthi Ell. & Kell., leaf spot. N.Y. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).

Alternanthera

(1) *A. bettzickiana* (Regel) Standl., garden alternanthera.
(2) *A. phylloxeroides* (Mart.) Griseb., alligatorweed.
(3) Other species.

Perennial herbs of tropical America. Many forms of (1) and some other species are grown for ornamental foliage; (2) is a weed in cultivated fields but furnishes food for wildlife.

Albugo bliti (Biv.-Bern.) Kuntze, white-rust. C.Z. (3).
Cercospora alternantherae Ell. & Langl., leaf spot. La., P.R. (3).
Fusarium oxysporum Schlecht., root rot, wilt. N.J. (1).
Guignardia cephalariae (Auers.) F.L. Stevens var. *alternantherae* (Sacc.) F.L. Stevens, on leaves. P.R. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. La. (2), Fla. (3).
Phyllosticta amaranthi Ell. & Ev., leaf spot. N.J.
Rhizoctonia solani Kuehn, root rot. Ill., N.J. (1); La. (2).
Uredo maculans Pat. & Gaill. (II), rust. C.Z. (3).

Amaranthus

I. Cultivated Species

(1) *Amaranthus caudatus* L., love-lies-bleeding.
(2) *A. hybridus* L., especially var. *hypochondriacus* (L.) Bailey, princesfeather.
(3) *A. tricolor* L., Josephscoat, including *A. gangeticus* L., tampala.

Annual herbs of tropical Asia: (1) and (2) grown for ornament, (3) also for greens; the primitive form of (2) is widely distributed as a weed but is useful to wildlife.

Albugo bliti (Biv.-Bern.) Kuntze, white-rust. Mass. to Fla., Tex., Nebr. (2).
Cercospora canescens Ell. & Martin, leaf spot. Md.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla., Md. (1), Fla. (2,3).
Phoma amaranthi Halst. (=*P. longissima* (Pers. ex Fr.) West.?), on stems. N.J. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Pythium debaryanum Hesse, damping-off. Conn. (1).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1), Tex. (1,3).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.Y. (1), Md. (3).

II. Naturalized Species, Mostly Weeds

(1) *Amaranthus blitoides* S. Wats., prostrate amaranth.
(2) *A. graecizans* L., tumbleweed.
(3) *A. retroflexus* L., rough pigweed.
(4) *A. spinosus* L., spiny amaranth.
(5) Species not determined or not designated.

Annuals: (1) naturalized from the western United States, (3) and (4) from tropical America; cosmopolitan weeds; useful to wildlife.

Albugo bliti (Biv.-Bern.) Kuntze, white-rust. General (*).
Alternaria amaranthi (Pk.) Van Hook (=*A. solani* Ell. & Martin) Sor.?), leaf spot. Ind., Kans., N.Y., Tex., Utah, Wash. (3).
Aphanomyces cochlioides Drechs., root rot. Iowa (3).
Aphelenchoides fragariae (Ritz.-Bos) Christie, in roots. Ark. (3).
Cercospora brachiata Ell. & Ev., leaf spot. Del., Fla. (3); Tex. (4); P.R. (5). *C. canescens* Ell. & Martin (*?C. celosiae* Syd.)—Ala.
Gloeosporium amaranthicola Dearn., anthracnose. N.C., Tex., Wis. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
H. schachtii A. Schm., root gall. Utah (3).
Meloidogyne sp., root knot nematodes. Fla. (2,3); Ala. (3); Ala., Fla., Tex. (4).
Peronospora amaranthi Gäum., downy mildew. N.J., N.Y.

Phoma amaranthicola Brun., on stems and inflorescence. Oreg. (2).
P. longissima (Pers. ex Fr.) West., on stems. Ohio, Tex. (3).
Phyllosticta amaranthi Ell. & Kell., leaf spot. Ala., Kans., Ky., Miss., N.J., Tex. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,3,4,5).
Pratylenchus pratensis (De Man) Filip., meadow nematode, brown root rot. (3).
Puccinia aristidae Tracy (O,I), rust. Colo. (1,2,3); Tex. (2,3).
Ramularia sp., leaf spot. Iowa (3).
Rhizoctonia solani Kuehn, root rot. Ill. (1); Tex. (2, 3); Wash. (1,2,3). Sterile stage of *Pellicularia filamentosa* (Pat.) Rogers. *R. (Corticium) microsclerotia*, reported on (3) in Fla., is considered a synonym.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Mont. (3).
Sclerotium rolfsii Sacc. (*Pellicularia rolfsii* (Curzi) E. West), stem rot. Fla. (3,4), La. (3).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (2,3); Oreg., Tex. (3).
MOSAIC—virus(es). In part, unidentified—Kans., Tex.; in part, muskmelon mosaic virus—Calif.; also experimentally infected with cucumber mosaic virus.
RING SPOT—unidentified virus. Colo. (3). Susceptibility to infection by tomato ring spot virus is reported.
SPOTTED WILT — virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (2).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Wis. (3). Also var. *californicus* Holmes—Calif. (3).

Celosia

C. argentea L., especially var. *cristata* Kuntze, cockscomb.

Weedy annual of tropical Asia, horticultural forms of which are grown for ornament.

Alternaria sp., leaf spot. N.J.
Cercospora celosiae Syd., leaf spot. Ala., Okla.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Kans., Ohio, Tex.
Phyllosticta sp., leaf spot. N.J.
Rhizoctonia solani Kuehn, damping-off. Conn.
Sclerotium bataticola Taub., charcoal rot. Tex.
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif., Tex.

Froelichia

Froelichia spp.

Annual or perennial herbs of dry plains; of minor forage value or may be grown for ornament.

Albugo froelichiae G. W. Wils., white-rust. Nebr., Tex.
Cercospora crassoides J. J. Davis, leaf spot. Okla., Tex., Wis.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla.
Phymatotorichum omnivorum (Shear) Dug., root rot. Tex.

Gomphrena

(1) *G. globosa* L., globe-amaranth.
(2) Other species.

Gomphrena globosa is an annual of Old World tropics grown for ornament; other species are native to the Southwestern States, of minor forage value.

Albugo bliti (Biv.-Bern.) Kuntze, white-rust. N. Mex. (2).
Alternaria sp., leaf spot. P.R. (1).
Cercospora gomphrenae Ray, leaf spot. Okla., ?Ga., Tex.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla. (1).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Tex. (1,2).

Iresine, bloodleaf

(1) *I. herbstii* Hook. f.
(2) *I. lindenii* Lem.
(3) *I. celosia* L.
(4) Other species.

Herbs or shrubs grown for ornamental foliage, or weeds: (1) and (2) from South America; (3) and (4) from various warm regions.

Cercospora gilbertii Speg., leaf spot. P.R. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md. (1,2), ?Fla. (3).
Puccinia striolata (Speg.) Arth. (II,III), rust. P.R., V.I. (4).
Ragnhildiana gonatoclada (Syd.) Solheim & F. L. Stevens, leaf spot. P.R. (3,4).
Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot. Tex. (4).
R. solani Kuehn, root rot. Ill. (1).
Septoria iresines Speg., leaf spot. Okla. (3).
Thecaphora iresine (J. A. Elliott) Jacks., inflorescence smut. Ind. (3).
Uromyces iresines Lagh. (I,III), rust. V.I. (4).

AMARYLLIDACEAE

Amaryllis

(1) *A. belladonna* L. (*Hippeastrum puniceum* Urb., *H. equestre* Herb.), belladonna-lily.
(2) Hybrid *Amaryllis* (cultigen derived from *A. reginae* L., *A. vittata* Herb., and others).

Bulbous herbs of tropical America, cultivated for ornament under glass and as house plants, also in the open in the Far South and California.

Asterinella hippeastri Ryan, black mildew. P.R. (1).
Botrytis cinerea Pers. ex Fr., gray-mold blight, bulb rot. Occasional (1,2), chiefly in outdoor plantings after chilling.
Cercospora amaryllidis Ell. & Ev., leaf spot. Tex. (1); Ala., La., P.R. (2).
Epicoccum purpurascens Ehr., secondary leaf spot. Calif.

Phyllosticta spp.: See *Stagonospora curtisii.*
Pythium debaryanum Hesse, seedling root rot. Fla., Tex. (2).
Rhizopus stolonifer (Ehr. ex Fr.) Lind, soft rot of bulbs.
Sclerotium rolfsii Sacc., southern blight, bulb rot. Fla., Tex. (1,2).
Stagonospora curtisii (Berk.) Sacc. (*S. crini* Bub. & Kab.), red blotch, leaf scorch. General, especially on (2), occasionally on (1). Reports of *Phyllostica* spp. on amaryllis probably refer to this in immature state.
Mosaic—unidentified virus. Calif. (1,2); Fla., Okla., Wis., T.H. (2).
Spotted wilt — virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Tex. (1,2).

Cooperia, rainlily

(1) *C. drummondii* Herb.
(2) *C. pedunculata* Herb.

Bulbous herbs of Texas and New Mexico, grown for ornament in the Gulf States.

?ercospora amaryllidis Ell. & Ev., leaf spot. Tex.
?uccinia cooperiae Long (O,I,II,III), rust. Tex.

Crinum

(1) *C. americanum* L., Florida crinum.
(2) *C. longifolium* Thunb., Jamaica crinum.

Bulbous herbs of the Gulf States (1), or tropical Africa (2); both species, but especially (2), grown in gardens in the South and sometimes as house plants.

Cercospora pancratii Ell. & Ev., leaf spot. Miss. (1); Ala., Fla., P.R., V.I. (2).
Stagonospora curtisii (Berk.) Sacc., red spot. Calif., N.Y. (2).
Mosaic—unidentified virus. Calif. (2).

Eucharis

E. grandiflora Planch., Amazon-lily.

Flowering bulb of the northern Andes, grown under glass or indoors.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Fla.
Stagonospora curtisii (Berk.) Sacc., red spot. Calif. (1).
Mosaic—unidentified virus. P.R.

Furcraea

(1) *F. gigantea* Vent., Mauritius-hemp.
(2) Other species.

Succulent herbs of tropical America, grown there chiefly for ornament but the former is an important fiber plant in some countries.

Diplodia agaves Niessl (*?D. theobromae* (Pat.) Nowell), leaf rot. C.Z. (2).
Dothidella parryi (Farl. ex Cke.) Th. & Syd., leaf spot. P.R. (1).
Echidnodella fourcroyae Ryan, on leaves. P.R. (2).
Heterodera marioni (Cornu) Goodey. See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md. (1).
Phoma fourcroyae Thuem., on leaves. P.R. (2).

Galanthus

G. nivalis L., snowdrop.

Hardy spring-flowering bulbs of southern Europe and Asia.

Botrytis galanthina (Berk. & Br.) Sacc. Botrytis blight. Not reported in our range on growing plants, but found in the sclerotial stage on imported bulbs.
Sclerotium sp. Occurrence as above but a distinct form.

Hippeastrum

See *Amaryllis.*

Hymenocallis, spiderlily

(1) *H. calathina* Nichols, basketflower.
(2) *H. caribaea* Herb.
(3) *H. crassifolia* Herb.
(4) Other species.

Bulbous herbs of tropical and semitropical America, grown for ornament, especially (1): (1) introduced from the northern Andes region; (2) native in the Caribbean region; (3) native in southern United States.

Cercospora amaryllidis Ell. & Ev.,—Tex. (4).
C. pancratii Ell. & Ev., leaf spot. P.R. (2,4). Fla., La. (3); Tex., P.R. (4).
Gloeosporium hemerocallidis Ell. & Ev., leaf spot. Tex. (4).
Mycosphaerella aggregata Earl, on leaves. Tex., P.R. (4).
Phyllosticta hymenocallidis Seaver: See *Stagonospora curtisii.*
Stagonospora curtisii (Berk.) Sacc., red spot. Calif. (1), P.R. (2,4), Tex. (4).
Mosaic—unidentified virus. Calif. (3,4).

Hypoxis

H. hirsuta (L.) Coville, golden-stargrass.

Small herb of dry ground in the Eastern and Central States and southward, sometimes grown in rock gardens, useful to wildlife.

Cylindrosporium guttatum Wint., leaf spot. Wis.
Septoria hypoxis (*hypoxi*) Overh., leaf spot. Pa.
Urocystis hypoxys Thaxt., floral smut. Conn., Mass.
Uromyces affinis Wint. (I,III), rust. Mo., ?Conn., ?Miss.
U. necopinus Cummins (I,II,III)—N.Y.

Leucojum

L. vernum L., snowflake.

Hardy spring-flowering bulb of Europe.

Botrytis sp. (*?Sclerotinia*), scale speck. Oreg.
Stagonospora curtisii (Berk.) Sacc., red spot. Calif.

Lycoris

(1) *L. radiata* Herb.
(2) *L. squamigera* Maxim.

Hardy flowering bulbs of eastern Asia, grown in gardens, (1) also as a pot plant.

Aphelenchoides ?olesistus (Ritz.-Bos) Steiner & Buhrer, bulb scale rot (?secondary). N.C. (1), Va. (2).
Ditylenchus dipsaci (Kuehn) Filip., bulb scale rot. N.C., Va. (1).
Hoplolaimus sp., root nematode. N.C. (1).
Stagonospora curtisii (Berk.) Sacc., red spot. Calif. (2).

Narcissus, narcissus, daffodil

Hybrid *Narcissus*. Spring (or winter) flowering bulbs derived mainly from the following species of southern and western Europe: *N. jonquilla* L., jonquil; *N. poeticus* L., poets narcissus; *N. pseudo-narcissus* L., trumpet narcissus, daffodil; *N. tazetta* L., polyanthus narcissus; Other species. Most of the records do not discriminate between these types. Widely grown in gardens, also under glass and in the open for cut flowers; hardy except (4). Commercial culture of hardy narcissus is carried on chiefly in Washington, Oregon, New York, Pennsylvania, Virginia, North Carolina; of polyanthus types in California, Texas, Florida, and South Carolina.

Aphelenchoides ?olesistus (Ritz.-Bos) Steiner & Buhrer, in bulbs causing scale necrosis. Fla., Ga., N.C., S.C. *A. subtenuis* (Cobb) Steiner & Buhrer, causing a similar disease, is reported in the same range and also in the Pacific Coast States. *A. parietinus* (Bast.) Steiner and *Aphelenchus avenae* Bast. are frequently associated with brown-ring symptoms but are probably secondary.

Armillaria mellea Vahl ex Fr., root and bulb rot. Calif., Oreg., Wash.

Aspergillus spp. (commonly *A. niger* v. Tiegh. and *A. flavus* Lk. ex Fr.), black mold, secondary dry rot. Cosmopolitan following nematode or mite injury and primary decays.

Botrytis spp., gray-mold blight, neck rot, dry scale rot. Widely reported, often without specific discrimination, but involving at least two distinct diseases: smolder (sprout necrosis) caused by *B. narcissicola* Kleb. (=*Sclerotinia narcissicola*), and fire (leaf blight) caused by *B. polyblastis* Dows. (=*S. polyblastis*), perhaps also *B. cinerea* Pers., the latter often on fading flowers and leaves.

Cylindrocarpon radicicola Wr., secondary root rot. N.C., N.Y., Oreg., Va., Wash.

Ditylenchus dipsaci (Kuehn) Filip., brown-ring disease, leaf "spikkel." Reported at times in all commercial narcissus areas and also other localities throughout the U. S. (1,2,3); Calif., Fla., Oreg., S.C. (4).

Fusarium oxysporum Schlecht. f. *narcissi* Snyd. & Hans. (*F. bulbigenum* Cke. & Mass., in part), basal rot. General on hardy varieties; rare in typical form on polyanthus varieties. Other forms of *F. oxysporum*, and especially *F. moniliforme* Sheldon, also are associated with bulb and root rots but their significance is undetermined.

Gloeosporium sp. (*?Glomerella cingulata* (Ston.) Spauld. & Schrenk), leaf and stem rot. La., N.C.

Leptosphaeria sp., on leaves. Wash. (2).

Penicillium spp., blue mold. Occasional as wound rot and in damp storage.

Phyllosticta narcissi Aderh.: SEE *Stagonospora curtisii*.

Pratylenchus pratensis (De Man) Filip., root nematode. Ohio.

Ramularia vallisumbrosae Cav., white mold, Ramularia blight. Oreg., Wash.

Rhizopus spp. (commonly *R. stolonifer* (Ehr. ex Fr.) Lind, and probably others), soft rot, mushy rot. Cosmopolitan as sequel to sunscald and other thermal injuries, especially on (2).

Sclerotinia narcissicola Gregory, smolder, neck rot. N.C., N.Y., Oreg., Va., Wash., probably general in northern bulb districts (1,2,3,5). Not reported on (4).

S. polyblastis Gregory, fire, Botrytis blight. Calif. (3), Wash. (4).

Sclerotium (*?Sclerotinia*) sp., large scale-speck. Md., Mo., N.C., N.Y., Oreg., Va., Wash.; probably general in northern bulb districts (1,2,3). Not reported on (4).

Sclerotium sp. (*?S. bataticola* Taub.), small scale-speck, sometimes neck rot. Calif., Fla., N.C., N.Y., Oreg., Tex., Va.; probably general but especially in southern bulb districts. On all types, commonly on (4).

S. rolfsii Sacc. (including *S. delphinii* Welch), wet scale rot. Calif., Fla., N.Y., Va. (1,2,3); Fla. (4).

Stagonospora curtisii (Berk.) Sacc., leaf scorch. General, especially in eastern and southern bulb districts; on all types.

Trichoderma viride Pers. ex Fr., green mold, secondary scale and root rot. Cosmopolitan, following various injuries and primary decays.

MOSAIC (YELLOW STRIPE, GRAY DISEASE)—virus. General, affecting all types, and universal or nearly so in some varieties. Relationship to other viruses not established. Susceptible experimentally to onion yellow-dwarf virus, which has also been identified in natural material, but is not considered a typical narcissus mosaic virus.

WHITE STREAK—virus. Calif., Md., N.C., N.Y., Oreg., Wash.; probably general. Commonly on (3).

Nerine

(1) *N. sarniensis* Herb., Guernsey-lily.
(2) Other species.

Bulbous herbs of South Africa, grown for ornament indoors or in the open in the South.

Stagonospora curtisii (Berk.) Sacc., red spot, leaf scorch. Calif. (1,2).

Polianthes

P. tuberosa L., turberose.

Perennial herb of Mexico, grown for summer flowering in gardens mostly in the South, sometimes in greenhouses or as a house plant in the North.

Cercospora sp., leaf spot. Tex.

Erwinia carotovora (L. R. Jones) Holland, soft rot. N.C.

Helminthosporium sp., leaf and stem spot. Tex.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Calif., Fla., N.C., Tex., Va.

Pythium debaryanum Hesse, root rot., Tex.

Rhizoctonia solani Kuehn, root rot. N.C.

Sternbergia

S. lutea Roem. & Schult., fall-daffodil.

Hardy flowering bulb of the Mediterranean region, grown in gardens.

Stagonospora curtisii (Berk.) Sacc., red spot. Calif.

Vallota

V. speciosa Voss, scarboro-lily.

Flowering bulb of South Africa, grown as a pot plant.

Stagonospora curtisii (Berk.) Sacc., red spot. La.

Zephyranthes

(1) *Z. atamasco* Herb., atamasco-lily.
(2) *Z. candida* Herb., zephyrlily.
(3) Other species.

Spring-flowering bulbs: (1) native in the Southeastern and Gulf States, sometimes planted in gardens; (2) and (3), of subtropical America, grown in gardens in warm regions.

Colletotrichum liliacearum (Schw.) Ferr., leaf spot. N.C. (1).

Puccinia cooperiae Long (O,I,II,III), rust. Ala., N.C. (1); Fla. (1,3), Tex. (3). *P. zephyranthes* Ell. & Ev., a nomen nudum, also has been applied to this.

Sclerotium sp. (*?S. bataticola* Taub.), scale speck, ?dry rot. Oreg. (2).

Stagonospora curtisii (Berk.) Sacc., red spot. Calif.

ANACARDIACEAE

Anacardium, cashew

(1) *A. excelsum* Skeels.
(2) *A. occidentale* L.

Tropical American trees: (1) used chiefly for timber, (2) for edible nuts; grown throughout the West Indies and Central America, to some extent also in southern Florida and Hawaii.

Asterina carbonacea Cke. var *anacardii* Ryan, black leaf spot. P.R. (1).
Gloeosporium sp., ?anthracnose. T.H. (2).
Sclerotium rolfsii Sacc., seedling blight. Fla. (2).

Cotinus, smoketree

(1) *C. coggygria* Scop. (*Rhus cotinus* L.), common smoketree.
(2) *C. americanus* Nutt. (*C. obovatus* Raf.), American smoketree.

Small trees, grown for ornamental flower panicles and foliage: (1) native, range 16,17, 20,25,29; (2) Eurasian, cultivated in zone 5.

Cercospora rhoina Cke. & Ell., leaf spot. Ala., Tex. (1).
Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot. Md. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora obtusa (Schw.) Cke., on branches, ?dieback. Ga. (1).
Septoria rhoina Berk. & Curt. ex Sacc., leaf spot. Conn., Mass., N.Y., Va. (1);—(2).
Verticillium albo-atrum Reinke & Berth., wilt. Conn., Ill., Nebr., N.J., N.Y. (1).

Mangifera

M. indica L., mango.

Large evergreen tree of southeastern Asia, widely cultivated for edible fruit in tropical regions, also to a limited extent in southern Florida, California, and Texas.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches. T.H.
Capnodium spp., sooty mold. Fla., P.R., probably cosmopolitan. Sometimes reported as *C. mangiferum* Cke. & Br. but various species of this and related genera are probably included.
Cephaleuros virescens Kunze, green scurf. Fla., P.R. Cosmopolitan.
Colletotrichum gloeosporioides Penz.: SEE *Glomerella cingulata.*
Diaporthe sp., on twigs. T.H.
Diplodia cacaoicola P. Henn., *D. natalensis* P. Evans, *D. theobromae* (Pat.) Nowell: SEE *Physalospora.*
Elsinoë mangiferae Bitanc. & Jenkins, spot anthracnose. Fla., C.Z., P.R.
Gloeosporium sp., *G. mangiferae* P. Henn.: SEE *Glomerella.*
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose (fruit spot), flower and twig blight (wither-tip). Fla., Tex., P.R., T.H. Cosmopolitan.
Lophodermium mangiferae Koord., on leaves. P.R.
Meliola mangiferae Earle, black mildew. C.Z., P.R.
Oidium sp. (*?O. mangiferae* Berthet), powdery mildew. Calif., Fla.
Omphalia flavida (Cke.) Maubl. & Rang., leaf spot. P.R.
Pestalotia mangiferae P. Henn., leaf spot. Fla., P.R.
Phaeosphaerella mangiferae F. L. Stevens & Weedon, leaf spot. T.H.
Phomopsis sp., on twigs, ?dieback. Fla.
Phyllosticta mortoni Fairm., leaf spot. Fla., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora abdita (Berk. & Curt.) N. E. Stevens, and *P. rhodina* (Berk. & Curt.) Cke., on branches. Fla. Probably most of the *Diplodia* spp., commonly reported on this host associated with twig blight or dieback, are conidial stages of one or the other of these *Physalospora* spp.; some may pertain to *Tryblidiella.*
Polyporus gilvus (Schw.) Fr., sapwood rot. T.H.
P. sanguineus L. ex Fr.—Fla.
Septobasidium pilosum Boed. & Stein. and *S. pseudopedicellatum* Burt, brown felt. Fla.
Septoria sp., leaf spot. Fla., P.R.
Sphaceloma mangiferae Bitanc. & Jenkins: SEE *Elsinoë mangiferae.*
Trametes corrugata Pers. ex Bres., on dead wood. T.H.
T. hydnoides (Sw.) ex Fr.—Fla.
Tryblidiella fusca (Ell. & Ev.) Rehm, and *T. rufula* (Spreng. ex Fr.) Sacc., on dead branches. Fla.
LITTLE LEAF—zinc deficiency. Fla.

Pistacia, pistache

(1) *P. vera* L., pistachio.
(2) *P. chinensis* Bunge, Chinese pistachio.
(3) Other species.

The cultivated species are small to large trees; native to the Mediterranean region (1), to China (2), and one to southern Texas; grown in southern California and Texas for edible seeds (1) or as an understock for grafting (2).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif. (1).
Pellicularia koleroga Cke., thread blight. Fla. (2); Tex. (*).
Phyllosticta lentisci (Pass.) Allesch., leaf spot. Tex. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (*); Ariz., Calif. (3).
Physalospora obtusa (Schw.) Cke., on twigs. Ga. (2).
Pleurotus ostreatus Jacq. ex Fr., sapwood rot. Calif. (1).
Tryblidiella fusca (Ell. & Ev.) Rehm, and *T. rufula* (Spreng.) Sacc., on dead branches. Fla. (2).
Schizophyllum commune Fr., sapwood rot. Calif. (3).

Rhus, sumac

I. Deciduous Small Trees or Upright Shrubs

(1) *Rhus copallina* L., flame-leaf sumac. Range 20,21,22,23,24,25,27,28,29,30,32.
(2) *R. glabra* L., smooth sumac. Throughout the United States except the Pacific coast.
(3) *R. typhina* L., staghorn sumac. Range 18, 19,20,21,22,23,24,25,26,27,28.
(4) *R. vernix* L., poison-sumac. Range 22,23, 24,25,26,27,28,29,30.

Important wildlife-food plants, especially (2); useful for ground cover and erosion control and as a potential source of tannin (*); grown for ornamental foliage and fruit: (1) in zone 4, (2) in zone 2, (3) in zone 3.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., stem canker, dieback, "umbrella disease." N.Y. to Ga., Nebr., and Minn., especially (2) and (1). Other *Botryosphaeria* spp. reported on *Rhus*, as *B. ambigua* (Schw.) Sacc. and *B. sumachi* (Schw.) Cke. probably belong to *Physalospora*.
Cercospora rhoina (*rhuina*) Cke. & Ell., leaf spot. General (1,2); occasional (3,4).
C. bartholomaei Ell. & Kell.—Ind. (2).
C. infuscans Ell. & Ev.—Del. (4).
Cladosporium aromaticum Ell. & Ev. (*C. nervale* Ell. & Dearn.), leaf mold. Iowa, Nebr. (2); Wis. (1, 2,3); ?N.Y., W. Va. (3).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1).
Corticium galactinum (Fr.) Burt, white root rot. Md. (2).
Cryptodiaporthe aculeans (Schw.) Wehm., canker, dieback. Maine to Ala., Okla., and Iowa (*).
Cryptosporella leptasca (Pk. & G. W. Clint.) Sacc., on dead branches. N.Y. (3).
Cuscuta exaltata Engelm., dodder. Tex. (1).
Cylindrosporium irregulare (Pk.) Dearn. and *C. toxicodendri* Curt. ex Ell. & Ev.: SEE *Septoria rhoina*.
Cytospora spp., on dead twigs (?dieback, or secondary): C. *grandis* Pk.—Ala., N.Y. (3); *C. rhoina* Fr.—Maine, Mich., N.Y. (2); W. Va. (3).
Dendrophoma nigrescens Fairm., on dead branches. N.Y. (2).
Diaporthe spiculosa (Alb. & Schw. ex Fr.) Nits., on dead branches. Ala. (1); Ill., Mass., N.J., N.Y. (3,4).
D. peckii Sacc.—Mich. (4).
Diplodia rhois Sacc., on dead branches. Kans., Mich., N.J., W. Va. (2,3). SEE ALSO *Physalospora*.
Discohainesia oenotherae (Cke. & Ell.) Nannf., leaf spot. N.Y. to Ga. and W. Va. (*).
Endothia parasitica (Murr.) P.J. & H.W. Anderson, on dead branches. ?Va. (3).
Fusarium oxysporum Schlecht. f. *rhois* Snyd. & Hepting, wilt. Conn., Va. (3).
Hainesia rhoina Ell. & Sacc.: SEE *Discohainesia oenotherae*.
Haplosporella sumachi (Schw.) Ell. & Ev.: SEE *Physalospora obtusa*.
Libertella olivacea Patterson, on branches. Nebr. (2).
Mycosphaerella nigredo (Schw.) Lindau, on leaves. Pa. (2).
Myxosporium rhois (Berk. & Curt.) Sacc., on twigs. W. Va. (2,3).
Nectria cinnabarina Tode ex Fr., canker, dieback. N.Y., Okla. (3).
N. galligena Bres., trunk canker. N.Y., Pa., Va. (3).
Pezizella oenotherae (Cke. & Ell.) Sacc.: SEE *Discohainesia oenotherae*.
Phleospora irregularis (Pk.) Bub.: SEE *Septoria rhoina*.
Phoma pulchella (Berk. & Curt.) Sacc., on twigs. S.C. (1), Maine (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (*).
Physalospora obtusa (Schw.) Cke., on branches ?canker, inflorescence blight. N.Y. to Ala., Kans., and Mich. (*, especially 2 and 3). Usually reported in the conidial stage, *Sphaeropsis sumachi* (Schw.) Cke. & Ell.; also as *Haplosporella* and *Macrophoma*. *P. abdita* (Berk. & Curt.) N.E. Stevens, and *P. rhodina* (Berk. & Curt.) Cke. are also reported in Fla. (2).
Pileolaria effusa Pk. (O,III), rust. Ariz. On *R. cismontana* Greene, a form of *R. glabra*.
Polyporus spp., on dead or sometimes living trunks: *P. hirsutus* Wulf ex Fr. and *P. versicolor* L. ex Fr., usually on dead wood. *P. adustus* Willd. ex Fr., *P. pargamenus* Fr., *P. tulipiferus* (Schw.) Overh. Cosmopolitan (*).
P. pocula (Schw.) Berk. & Curt., sapwood rot. Fla., Md., W. Va. (*).
Poria cocos Wolf, on roots. Fla. (1). *P. punctata* (Fr.) Cke., wood rot, Mich. (4).
Schizophyllum commune Fr., sapwood rot. Cosmopolitan (*).
Septoria rhoina Berk. & Curt. ex Sacc., leaf spot. General (*). Usually reported as *Cylindrosporium toxicodendri* Curt. ex Ell. & Ev., which has an involved synonymy, but probably should yield to *C. irregulare* (Pk.) Dearn., based on *Septoria irregularis* Pk., if referred to *Cylindrosporium;* also reported as *Gloeosporium toxicodendri* Ell. & Martin, *Marssonina toxicodendri* (Ell. & Martin) Magn., and *Phleospora irregularis* (Pk.) Bub. The oldest name under *Septoria* is *S. rhoidis* Berk. & Curt. No asciger-ous stage is known.
Sphaeropsis sumachi (Schw.) Cke. & Ell.: SEE *Physalospora obtusa*.
Sphaerotheca humuli (DC.) Burr., powdery mildew. Eastern and North Central States (*).
Sporocybe rhois (Berk. & Curt.) Sacc.: SEE *Cryptodiaporthe aculeans*.
Steccherinum ochraceum (Pers. ex. Fr.) S.F.Gray (*Hydnum rhois* Schw.), wood rot. Pa. (*).
Stemphylium copallinum Ell. & Ev., on leaves. Ala. (1).
Taphrina purpurascens (Ell. & Ev.) Robinson, leaf curl, blister. Mass. to Ga., Tex., and Kans.; Conn. (2,3); Md. (3).
Thyronectria xanthoxyli (Pk.) Ell. & Ev., on branches. Conn., Ga., Miss. (2).
Tryblidiella rufula (Spreng. ex Fr.) Sacc., on dead branches. Ala., Fla., Ga. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Ill., Minn. (2); Iowa (2,3).

II. Deciduous Shrubs

(1) *Rhus aromatica* Ait., fragrant sumac. Range 20,22,23,24,25,26,27,28,29.
(2) *R. trilobata* Nutt., skunkbush sumac. Central States to the Pacific coast.

Useful in erosion control and important food

plants of wildlife; (1) is sometimes planted for ornament.

Cercospora rhoina Cke. & Ell., leaf spot. Ala., ?Calif., Mo. (1).
Cladosporium aromaticum Ell. & Ev., leaf mold. Calif. (1).
Cuscuta exaltata Engelm., dodder. Tex. (2).
Cylindrosporium toxicodendri Curt. ex Ell. & Ev. (=*Septoria rhoina* Berk. & Curt. ex Sacc.?) leaf spot. Mont. (2).
Discohainesia oenotherae (Cke. & Ell.) Nannf., leaf spot. N.J. (1).
Microdiplodia resurgens (Cke. & Hark.) Tassi, on branches. Calif. (2).
Oidium sp., powdery mildew. Wis. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Physalospora mutila (Fr.) N.E.Stevens (*Diplodia rhoina* Cke. & Hark.), on branches. Calif. (2).
Pileolaria patzcuarensis (Holw.) Arth. (O,I,II,III), rust. Colo., N. Mex., Okla. (2).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Conn., Ind., Pa. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Mass. (1), Iowa (2).

III. Evergreen Shrubs

(1) *Rhus integrifolia* (Nutt.) Benth. & Hook., lemonade sumac. Range 5,10.
(2) *R. laurina* Nutt., laurel sumac. Range 5.
(3) *R. ovata* S.Wats., sugar sumac. Range 5, 10,11.
(4) *R. sempervirens* Scheele, evergreen sumac. Range 11,16,17,20.

Important wildlife-food plants and useful in erosion control; sometimes planted for ornament, especially (2,3).

Armillaria mellea Vahl ex Fr., root rot. Calif. (2).
Cercospora rhoina Cke. & Ell. Tex. (4).
Coniothyrium rhois Tharp, leaf spot. Tex. (4).
Harknessia rhoina Ell. & Ev., leaf spot. Calif. (1).
Phyllosticta rhoiseda Fairm., leaf spot. Calif. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).
Telimena rhoina (Ell. & Ev.) Th. & Syd., black spot. Calif. (1).
Thyronectria xanthoxyli (Pk.) Ell. & Ev., on branches. Calif. (1).

IV. Woody Herbs, Climbing or Trailing Shrubs

(1) *Rhus diversiloba* Torr. & Gray, poison-oak. Range 1,2,3,4,5.
(2) *R. toxicodendron* L. (including *R. radicans* L.), poison-ivy. Throughout the United States except the Pacific coast and desert areas.

Plants with notoriously toxic sap, forest weeds but useful to wildlife.

Actinopelte dryina (Sacc.) Hoehn., leaf spot. Ill. (2).
Botryodiplodia compressa (Cke.) Sacc. f. *rhododendri* Dearn., on stems. N.Y. (2).
Botryosphaeria spp.: SEE *Physalospora*.
Cercospora bartholomaei Ell. & Kell., leaf spot. Ind., Kans., Wis. (2).
C. toxicodendri Ell.—Ind., Iowa, Md., Mass., N.J., Tex. (2).
Cercosporella californica Bonar, leaf spot. Calif. (1).
Cuscuta exaltata Engelm., dodder. Tex. (2).
Cylindrosporium irregulare (Pk.) Dearn. (*C. toxicodendri* Curt. ex Ell. & Ev.), leaf spot. Calif., Oreg., Wash. (1); Conn. to Miss., Kans., and Mont. (2). Also reported as *Marssonina toxicodendri* (Ell. & Mart.) Magn. and *Phleospora irregularis* (Pk.) Bub.; perhaps a synonym of *Septoria rhoina* Berk. & Curt.
Diaporthe peckii Sacc., on stems. N.J., N.Y. (2).
D. spiculosa (Alb. & Schw. ex Fr.) Nits.—Ill. (2).
Discohainesia oenotherae (Cke. & Ell.) Nannf., leaf spot. N.Y., Tenn., Va. (2).
Dothiorella spp. (*D. radicans* Ell. & Ev., *D. rhoina* Ell. & Ev., *D. toxica* Ell. & Ev.), on stems. Colo., Ill., N.J. (2). Probably conidial stage of *Botryosphaeria*. SEE ALSO *Physalospora*.
Exosporium pallidum Ell. & Ev., leaf spot. Tex. (2).
Ophiocarpella tarda (Hark.) Th. & Syd., leaf spot. Calif. (1).
Phlyctaena albocincta Ell. & Ev., on stems. N.J. (1).
Phoradendron villosum Nutt., mistletoe. Calif., Oreg. (1).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Mich., Wash. (2).
Phyllosticta spp., leaf spot: *P. rhoicola* Ell. & Ev.—Oreg. (1); N.Y., Tex., Wash., W. Va. (2). *P. toxica* Ell. & Martin—Ill., Iowa, Miss., S.C. (2).
P. toxicodendri Thuem.—S.C. (2). In part immature *Cylindrosporium* or *Septoria*.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Pileolaria toxicodendri (Berk. & Rav.) Arth. (O,I,II, III), rust. Calif., Oreg. (1); General (2).
P. effusa Pk. (O,III)—Ariz., Colo. (2).
Polyporus spp., on dead or injured stems: *P. adustus* Willd. ex Fr.—Md., W. Va. (2); *P. gilvus* (Schw.) Fr.—Md. (2); *P. hirsutus* Wulf. ex Fr.—Md. (2).
Poria unita (Pers.) Cke., on dead wood. Calif. (1), Mich. (2).
Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot. Tex. (2).
Schizophyllum commune Fr., on dead wood. Va. (2).
Septoria spp. (*S. irregularis* Pk., *S. rhoina* Berk. & Curt., *S. toxicodendri* Curt. ex Ell. & Martin). SEE *Cylindrosporium*, above, and *Septoria*, in section I.
Tryblidiella rufula (Spreng. ex Fr.) Sacc., on dead stems. Calif. (1); Ga., Miss. (2).

Schinus, peppertree

(1) *S. molle* L., California peppertree.
(2) *S. terebinthifolia* Raddi, Brazil peppertree.

Small evergreen trees: (1) native in tropical America, (2) in Brazil; grown for ornament in the open in California, or as conservatory plants.

Armillaria mellea Vahl ex Fr., root rot. Calif. (1); Tex. (1,2).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on twigs. T.H. (1,2).
Cuscuta subinclusa Dur. & Hilg., dodder. Calif. (1).
Diaporthe sp., on twigs. T.H. (1,2).
Fomes applanatus (Pers. ex Wallr.) Gill., heart rot. Calif. (1).
Ganoderma polychromum (Copeland) Murr., wood rot. Calif. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meliola malacotricha Speg., black mildew. P.R. (1).
Meloidogyne sp., root knot nematodes. Tex. (1,2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz. (1), Tex. (1,2).
Polyporus spp., heart rot: *P. dryophilus* Berk.—Calif. (1); *P. farlowii* Lloyd—Ariz., Calif. (1); *P. sulphureus* Bull. ex Fr.—Calif. (1).
P. versicolor L. ex Fr., sapwood rot. Calif. (1).

Rotylenchus reniformis Linford & Oliveira, root nematode. T.H. (2).
Schizophyllum commune Fr., wound rot. Calif. (1).
Stereum hirsutum Willd. ex Fr., on dead wood. Calif. (1).
Trametes hispida Bagl., sapwood rot. Calif. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Calif. (2).

Spondias, mombin

(1) *S. mombin* L., yellow mombin.
(2) *S. purpurea* L., purple mombin.

Medium to large trees of tropical America, grown in warm regions for edible fruit and ornament.

Cerotelium alienum (Syd. & Butl.) Arth. (II,III), rust. P.R. (1); O and I unknown.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meliola comocladiae F.L.Stevens, black mildew. P.R. (1).
Meloidogyne sp., root knot nematodes. Fla. (1).
Sphaceloma spondiadis Bitanc. & Jenkins, spot anthracnose. Fla. (2).

ANNONACEAE

Annona

(1) *A. cherimola* Mill., cherimoya.
(2) *A. muricata* L., soursop.
(3) *A. reticulata* L., custard-apple.
(4) *A. squamosa* L., sugar-apple.

Small trees of northeastern South America (1) and of tropical America (2,3,4); grown for edible fruit in warm regions, (1) to a limited extent in California and Territory of Hawaii, and (4) in Florida.

Armillaria mellea Vahl ex Fr., root rot. Calif. (1).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1).
Diplodia natalensis P.Evans, stem blight. Tex. (4).
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, fruit rot. Fla. (1); P.R. (2,3).
Morenoella portoricensis Speg., black mildew. P.R.
Mycosphaerella sp., leaf spot. P.R. (2).
Phakopsora cherimoliae (Lagh.) Cumm. (II,III), rust. Fla. (1,4), Tex. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).

Asimina, pawpaw

(1) *A. triloba* (L.) Dun., common pawpaw. Range 20,22,24,25,27,28,29,30.
(2) Other species.

Small tree sometimes planted for edible fruit or ornament (1), or low shrubs of the Southeastern States, chiefly Florida, (2).

Cercospora asiminae Ell. & Kell., leaf spot. Ala., Kans., Md., Miss., Tex. (1); Ala., Miss. (2).
Cylindrocladium scoparium Morg., on fallen leaves. W. Va. (1).
Dothiorella aberrans Pk., on branches. Ohio (1). *D. asiminae* Ell. & Ev.—W. Va. (1). Probably conidial stage of *Botryosphaeria*.
Gloeodes pomigena (Schw.) Colby, on twigs. Ind. (1).
Mycosphaerella sp. (*Sphaerella asiminae* Ell. & Kell.), leaf spot. Ind., Ohio, W. Va. (1). Associated with *Phyllosticta asiminae*.
Myrothecium roridum Tode ex Fr., on leaves. W. Va. (1).
Nectria cinnabarina Tode ex Fr., on twigs, ?canker. Ind., W. Va. (1).
Phleospora asiminae Ell. & Morg., leaf blotch. Ill., Kans., Mo., Ohio, W. Va. (1).
Phoma microsporella Karst. & Har., on leaves. Ind., Ohio (1).
Phyllosticta asiminae Ell. & Kell., bordered leaf spot, eyespot. Md. to Miss., Tex., and Mich. (1); Fla., Ind., Md. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Polyporus amplectrens (Murr.) Sacc. & Trott. (=*P. fruticum* Berk. & Curt. ?), branch canker, dieback. Fla., Ga. (2).
Poria isabellina (Fr.) Overh., sapwood rot. Va., W. Va. (1).
P. punctata (Fr.) Cke.—Va. (1).
Septoria asiminae Ell. & Ev. (nomen nudum ?), leaf spot. Tex. (1).
Sphaeropsis asiminae Ell. & Ev., on branches, ?canker. Md., W. Va. (1).
Valsa ambiens Pers. ex Fr., on dead twigs, ?dieback. Va., W. Va. (1).

Rollinia

R. deliciosa Safford, biriba.

Tropical American shrub grown for edible fruit in the West Indies and sometimes in southern Florida.

Glomerella cingulata (Ston.) Spauld. & Schrenk, dieback, fruit rot. Fla.

APOCYNACEAE

Amsonia

(1) *A. ciliata* Walt.
(2) *A. tabernaemontana* Walt.

Perennial herbs of woodlands: (1) in the Southern States, (2) ranging farther north; grown for ornament.

Coleosporium apocynaceum Cke. (II,III), rust. Fla., Ga., S.C. (1); Ala., Ga., S.C. (2). O and I on *Pinus* spp.
Mycosphaerella sp. Ga. (2).
Puccinia seymouriana Arth. (O,I), rust. Mo. (2). II and III on *Spartina* spp.

Apocynum, dogbane

(1) *A. androsaemifolium* L., spreading dogbane.
(2) *A. cannabinum* L., Indian hemp.
(3) *A. sibiricum* Jacq., prairie dogbane.

Perennial herbs of fields and woodland borders: (1) ranging throughout the United States, a valuable honey plant; (2) Central and Eastern States, its roots yield medicinal compounds; (3) Northern and Western States.

Aecidium apocyni Schw.: See *Puccinia smilacis*.

Cercospora apocyni Ell. & Kell., leaf spot. North Central States, Tex., Va. (1); Ill., Kans., Mich., Mont., Tex., Wis. (2).
Cylindrosporium apocyni Ell. & Ev., leaf spot. Del., Iowa, Tex., Wis. (1); Va. (2). SEE ALSO *Septoria littorea.*
Gloeosporium apocyni (Pk.) Ell. & Ev.: SEE *Stagonospora apocyni.*
Laestadia apocyni Ell. & Ev., on stems. N.Dak. (3).
Phyllosticta apocyni Trel. (=*P. asclepiadeum* Desm.?), leaf spot. Iowa, N.Y., Oreg., Pa., Wis. (1); Miss., N.J., N.Y., Wis. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Puccinia seymouriana Arth. (O,I), rust. Ind., Kans., N.J., N.Y. (2); Ill., Kans., Nebr., Okla., S. Dak. (3).
P. smilacis Schw. (O,I), rust. Del., Ill., Kans., Md., N.C., Tenn., Va., Wis. (1,2). II and III on *Smilax* spp.
Septogloeum apocyni Pk.: SEE *Stagonospora apocyni.*
Septoria littorea Sacc., leaf spot. Mich. (1); Kans., N. Dak., Nebr. (2); Ohio (2,3). May include *Cylindrosporium apocyni.*
Stagonospora apocyni (Pk.) J.J.Davis, leaf spot. Ill., Iowa, N.Y., Wis. (1); Ind., N.Y., Va., Wis. (2).

Carissa

(1) *C. arduina* Lam., hedgethorn.
(2) *C. carandas* L., caranda, perunkila.
(3) *C. grandiflora* DC., Natal-plum.

Evergreen shrubs of the eastern tropics, grown as hedge plants or for ornament and edible fruit, especially (3), in southern Florida and California.

Colletotrichum gloeosporioides Penz., leaf spot. Fla. (2).
Diplodia sp., dieback. Fla. (3). SEE *Physalospora.*
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophoma sp., leaf spot. Calif. (3).
Meloidogyne sp., root knot nematodes. Fla. (1,3), Calif. (3).
Phymatotrichum omvivorum (Shear) Dug., root rot. Tex. (3).
Physalospora obtusa (Schw.) Cke., and *P. rhodina* (Berk. & Curt.) Cke., on twigs, ?dieback. Fla. (3).
Rhizoctonia microsclerotia Matz (=*Pellicularia filamentosa* (Pat.) Rogers?), root rot. P.R. (3).
Septoria sp., leaf spot. Calif. (3).
Sphaeropsis sp., on twigs, dieback. Fla. (2). SEE *Physalospora.*

Nerium

N. oleander L., oleander.

Evergreen shrub or small tree of the Mediterranean region; grown for ornament in the open in the Far South and California, and as a tub plant in the North.

Alternaria sp. (*Macrosporium nerii* Cke.), leaf spot (secondary?). Ala., Calif., Fla., Ga., Miss.
Capnodium elongatum Berk. & Desm. (*C. nerii* Rabh.), sooty mold. Ala., Fla.
Cercospora neriella Sacc., leaf and seedpod spot. Ala., Fla., La., Tex.
C. repens Ell. & Ev.—Tex.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Colletotrichum sp., anthracnose. Tex.: SEE *Gloeosporium.*
Cuscuta indecora Choisy, dodder. Fla.
Diaporthe sp., on twigs. T.H.
Diplodia nerii Sacc., on twigs. Calif.
Gloeosporium sp. (*?G. oleandri* Sacc., *Colletotrichum* sp.), leaf spot, anthracnose. Mass., Miss., Tex. Probably conidial stage of *Glomerella cingulata.*
Haplosporella nerii Sacc., on branches. Fla. Probably a *Physalospora.*
Phyllosticta nerii West., leaf spot. Fla., La., Mich., Miss., T.H.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on twigs. Ga., T.H.
Pseudomonas tonelliana (Ferr.) Burkh. (*P. savastanoi* E.F.Sm. var. *nerii* C.O.Sm.), bacterial knot. Ariz., Calif., Conn., Tex.
Septoria oleandrina Sacc., leaf spot. Calif., Fla., La.
Sphaeropsis sp., canker, witches'-broom. Fla., N.H. SEE ALSO *Physalospora.*

Plumeria, frangipani

Plumeria spp.

Small to medium deciduous trees of tropical America; several kinds grown for ornament there, and one in southern Florida.

Coleosporium domingense (Berk.) Arth. (II,III), rust. Fla., C.Z., P.R. O and I unknown.
Meliola tabernaemontana Speg., black mildew. P.R.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Tabernaemontana

(1) *T. coronaria* Willd., crape-jasmine.
(2) *T. grandiflora* Jacq.
(3) Other species.

Evergreen shrubs of tropical America, grown for ornament.

Cephaleuros virescens Kunze, green scurf. Fla. (1).
Cladosporium sp., leaf mold. Fla. (1).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1).
Gloeosporium tabernaemontanae Speg., leaf spot. Fla. (3).
Hypospilina ospinae (Chardon) Chardon & Toro, on leaves. P.R. (3).
Meliola tabernaemontanae Speg., black mildew. C.Z., P.R. (2,3).

Trachelospermum

T. jasminoides Lem., confederate-jasmine.

Evergreen twining shrubs of China, grown for ornament, zone 7, or under glass.

Cercospora repens Ell. & Ev., leaf spot. La.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Dimerosporium pulchrum Sacc., sooty mold. La.

Vinca, periwinkle, ground-myrtle

(1) *V. major* L., bigleaf periwinkle.
(2) *V. minor* L., common periwinkle.

Trailing evergreen herbs of Europe, grown for ornament in baskets and beds and extensively for ground cover, (2) widely naturalized in the Eastern and Southern States.

(3) *V. rosea* L. (*Lochnera rosea*), Madagascar periwinkle.

Perennial herb or shrub grown for ornament, often as a bedding annual, also in greenhouses and as a house plant.

Alternaria sp. (*?A. tenuis* Nees ex Cda.), leaf spot, stem rot (?secondary). Pa., Tex. (2).

Botrytis cinerea Pers. ex Fr., gray-mold blight. Conn., Wash. (2).

Cladosporium herbarum Lk., leaf mold. Md., N.Y., Pa.

Coleosporium apocynaceaum Cke. (II,III), rust. P.R. (3). O and I on *Pinus* spp.

Colletotrichum sp., leaf spot. Fla. (2).

Cuscuta indecora Choisy, dodder. Tex. (3). *C. campestris* Yuncker is used on this host in experimental transmission of viruses.

Diplodia vincae Sacc. & Wint., on stems and leaves (secondary). Md., Ohio (2).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Macrophoma vincae (Curr.) Berl. & Vogl., leaf spot, dieback. Ill. (1), N.Y. (2).

Meloidogyne sp., root knot nematodes. Ohio (1); Kans., Ohio (3).

Phomopsis lirella (Desm.) Grove, canker, dieback. Md., N.J., Ohio, Pa., Va., ?Conn. (2). Said to be the conidial stage of *Diaporthe vincae* Cke. (=*D. eumorpha* (Dur. & Mont.) Maire).

Phyllosticta spp., leaf spot. Ga., N.J. (1); Conn. (2). *P. minor* Ell. & Ev.—Md., N.J., N.Y., Va. (2). *P. vincae-majoris* Allesch.—Calif.

Physalospora obtusa (Schw.) Cke., on stems. N.Y., Va. (2). Some reports of *Sphaeropsis vincae* may belong here.

Phytophthora colocasiae Rac., leaf rot. T.H. (3).

P. parasitica Dast., stem rot. Md. (2).

Puccinia vincae (DC.) Berk. (O,I,II,III), rust. Mass., Mich., N.Y., Wash. (1).

Rhizoctonia solani Kuehn, root and stem rot: Ill. (1); Md., N.J., Pa., Va. (2).

Septoria vincae Desm., leaf spot. N.J. (1); N.Y. (2).

Sphaeropsis vincae Curr.: SEE *Macrophoma vincae.*

Sphaeropsis vincae Sacc. & Wint.: SEE *Diplodia.* SEE ALSO *Physalospora obtusa.*

Volutella vincae Fairm., leaf spot. N.Y., Pa. (2).

MOSAIC—virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.). Fla. (3).

YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Kans. (1), ?Tex. (3). Susceptibility of (3) to the following viruses has been experimentally shown: *Aureogenus magnivena* Black, *C. santali* Holmes, *C. vaccinii* Holmes, *Marmor lacerans* Holmes, and *Ruga verrucosans* Carsner & Bennett. There are also variegated forms of (1) and (2).

AQUIFOLIACEAE

Ilex, holly, inkberry (evergreen); winterberry (deciduous)

I. Evergreen Species, Native

(1) *Ilex opaca* Ait., American holly. Range 20,25,27,28,29,30.

(2) *I. coriacea* (Pursh.) Chapm. Range 28, 29,30.

(3) *I. glabra* (L.) A.Gray, inkberry. Range 26,27,28,29,30.

(4) *I. cassine* L., dahoon. Range 29,30.

(5) *I. vomitoria* Ait., yaupon. Range 20,28,29, 30.

Small or sometimes large trees (1,2,4) or shrubs (3,5); all, but especially (1) and (4), cultivated for ornament, and the wood of (1) also used commercially in cabinetmaking; useful to wildlife.

Amerodothis ilicis (Cke.) Th. & Syd., on twigs. Tex. (1).

Asterina spp., black mildew: *A. ilicis* Ell.—Ga., Miss. (1); N.J. (3).

A. pelliculosa Berk.—Ala., Miss., Tex. (1); Fla., Ga., Miss. (2).

A. cuticulosa Cke.: SEE *Microthyriella cuticulosa.*

A. orbicularis Berk. & Curt.: SEE *Englerulaster orbicularis.*

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches. Ga. (1).

Capnodium spp., commonly *C. elongatum* Berk. & Desm., sooty mold. Gulf States (*).

Cercospora ilicicola Lieneman, leaf spot. S.C., Tex. (1).

C. ilicis Ell.—Ala., Fla., Miss., N.J. (3).

C. pulvinula Cke. & Ell.—Md., N.J., Tex. (1); Fla. (4).

Chrysomyxa ilicina (Ell. & Ev.) Arth. (II, III), rust. N.C., Tenn., W. Va. (1). O and I unknown.

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1).

Coniothyrium ilicinum Ell. & F.W.Anderson, on leaves. Md., N.Y. (1).

Corticium galactinum (Fr.) Burt, root rot. Md. (1).

Cuscuta compacta Juss., dodder. Fla. (3).

Daldinia vernicosa (Schw.) Ces. & de N., wood rot. Md. (1).

Dermea olivacea Ell. (*?Pezicula* sp.), on twigs. N.J. (3). *D. olivacea* Otth has priority.

Dermea peckiana (Rehm) Groves.—N.J. (3).

Diaporthe oxyspora (Pk.) Sacc., on branches. Md., N.C., N.J., N.Y., Okla., W. Va. (1).

Diatrypella opaca Cke., on branches. Fla., Ga., Miss., Tex., W. Va. (1).

D. quercina (Pers. ex Fr.) Nits.—Ga., W. Va. (1).

Diplodia sp. (*?D. ilicicola* Desm.), on branches, ?dieback. Fla., N.J., W. Va. (1); leaf spot—N.Y. (1).

Discosia artocreas Tode ex Fr., secondary leaf spot. Ala., Md. (1). *D. deflectens* Sacc.—S.C. (1). *D. minima* Berk. & Curt.—Ala. (1).

Echidnodella spp., black scurf. Gulf States (2,3). *E. angustiformis* (Tracy & Earle) F.L.Stevens & Ryan (including *Morenoella ilicis* (Tracy & Earle) Th.)—Miss. (2); Fla., Ga., Miss. (3). *E. prinoides* (Tracy & Earle) F.L.Stevens & Ryan—Miss. (2).

Englerulaster orbicularis (Berk. & Curt.) Hoehn., black spot, black mildew. Del. to Fla. and Tex. (1); Ala., Fla., Miss., S.C. (2); Fla., Ga. (3); Fla. (4).

Fomes australis Cke., wood rot. Fla. (1).

Fusarium solani (Mart.) Appel & Wr., on twigs, ?dieback. N.J. (1).

Fusicoccum ilicinum Ell. & Ev., on twigs. W. Va. (1).

Gloeosporium ilicis Dearn., on leaves. Tenn. (1).

Lembosiopsis brevis (Tracy & Earle) Th., black mildew. Fla.

Leptothyrium foraminulatum Sacc. & Ell., on leaves. Fla., Md., N.C., Tenn., W. Va. (1).

Macroderma curtisii (Berk. & Rav.) Hoehn.: SEE *Phacidium curtisii.*

Macrophoma phacidiella (Cke. & Ell.) Berl. & Vogl., leaf spot. N.J., Tenn. (1).

Microsphaera alni DC. ex Wint., powdery mildew. Fla.

Microthyriella cuticulosa (Cke.) Hoehn., black speck. Ga., Miss. (1).

Morenoella ilicis (Tracy & Earle) Th., black spot. Fla., Ga. (3).
Mycosphaerella ilicella (Cke.) House, on leaves. N.Y. (1).
M. ilicis (Ell. & Ev.) Lindau—Fla., Md., Miss., N.J., S.C. (3).
Nectria coccinea Pers. ex Fr., on branches. Conn., W. Va. (1). *N. rubricarpa* Cke.—N.J. (3).
Pellicularia koleroga Cke., thread blight. La. (2,3).
Pestalotia annulata Berk. & Curt., secondary leaf spot. Ala., Miss., N.J. (1); Fla. (4).
P. stellata Berk. & Curt.—Md., Miss., N.J., S.C., Tex.
Phacidium curtisii (Berk. & Rav.) Luttrell, tar spot. Mass. to Fla. and Tex.
P. sphaeroideum Cke. & Ell., on leaves. N.J. (3).
Phoma ilicicola (Cke. & Ell.) Sacc.: SEE *Physalospora ilicis.*
Phoma ilicina Ell. & F.W. Anderson, on leaves. Md. (1).
P. ilicis Desm., on leaves. N.J. (1). Perhaps the conidial stage of *Phacidium* sp.?
Phyllactinia corylea Pers. ex Karst., powdery mildew. Tenn. (1).
Phyllosticta ilicicola (Cke. & Ell.) Ell. & Ev.: SEE *Physalospora ilicis.*
Phyllosticta opaca Ell. & Ev., leaf spot. S.C., Tex., W. Va. (1).
P. terminalis Ell. & Martin—Miss. (1); Fla. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. (4,5).
Physalospora ilicis (Schleicher ex Fr.) Sacc., leaf spot. N.C., N.J., N.Y., Tex., S.C., W. Va. (1); Fla. (2).
P. obtusa (Schw.) Cke., on branches. Md. (1).
P. rhodina (Berk. & Curt.) Cke.—Fla., S.C. (1).
Pleurotus ostreatus Jacq. ex Fr., wood rot. Md. (1).
Polyporus spp., wood rot on dead branches and trunks: *P. adustus* Willd. ex Fr.—Md. (1); *P. hirsutus* Wulf. ex Fr.—Md. (1); *P. pargamenus* Fr.—Ala. (1).
Poria spp., wood rot: *P. inermis* Ell. & Ev.—La. (3); Md., Pa. (1); *P. nigrescens* Bres.—Pa. (1); *P. versipora* Pers. ex Romell—Ark., La. (3); Md., Pa. (1).
Rhizoctonia solani Kuehn, leaf rot of cuttings. Md. (1).
Rhytisma curtisii Berk. & Rav.: SEE *Phacidium curtisii.*
Rhytisma ilicincola (Schw.) Fr. (*?R. prini* (Schw.) Fr.), tar spot. Tex. (4), Va. (5).
Schizophyllum commune Fr., wood rot. Md. (1).
Septobasidium spp., brown felt on scale insects on twigs: *S. castaneum* Burt— Fla., N.C. (1); *S. cremeum* Couch—Fla. (3); *S. leprieuri* (Mont.) Pat.—Fla. (3); *S. pseudopedicellatum* Burt—Fla., N.C. (1); *S. sinuosum* Couch—Fla. (1,3).
Septoria ilicifolia Cke. & Ell., on leaves. N.J., (1).
Sphaeronema stellatum Ell.: SEE *Dermea peckiana.*
Sphaeropsis ilicicola Cke. & Ell.: SEE *Physalospora ilicis. S. phacidiella* Cke. & Ell.: SEE *Macrophoma phacidiella.*
Sporonema ilicis Earle, on fading leaves. Ala. (1).
Stereum spp., on dead branches: *S. rameale* Schw., *S. sericeum* Schw., and *S. umbrinum* Berk. & Curt.—Md. (1).
Tryblidiella hysterina (Duf.) Shear, on twigs. Ala., La., N.C. (4).
T. rufula (Spreng. ex Fr.) Sacc.—Ala., Fla. (1,4).
Ustulina deusta (Hoffm. ex Fr.) Petr., wood rot. Md. (1).
Winterina lobata (Tracy & Earle) Sacc. & Syd., on leaves. Fla., Ga., Miss. (2).
CHLOROSIS—mineral deficiency attributed to excess of lime. Occasional, especially (1).
PURPLE LEAF BLOTCH — physiological, attributed to drought and nutritional deficiencies. Md. (1).

II. Evergreen Shrubs or Small Trees, Introduced

(1) *Ilex aquifolium* L., English holly.
(2) *I. cornuta* Lindl., Chinese holly.
(3) *I. crenata* Thunb., Japanese holly.
(4) Other species.

European (1) or eastern Asian (2,3) shrubs or small trees, cultivated for ornament, hedges, and Christmas greens: (1) and (3) in zone 6, (1) especially in the Pacific Northwest; (2) in zone 7.

Boydia insculpta (Oud.) Grove, canker, dieback. Oreg., Wash. (1).
Diaporthe eres Nits. (*D. crustosa* Sacc. & Roum.), on dead branches, (canker). Oreg. (1).
Diplodia sp., on twigs, ?dieback. Md. (1).
Fumago vagans Pers., sooty mold. Oreg., Wash. (1).
Gloeosporium aquifolii Penz. & Sacc., leaf spot. N.J., Tex., Wash. (1).
Macrophoma ilicella (Sacc. & Penz.) Berl. & Vogl.: SEE *Physalospora ilicis.*
Metasphaeria ilicis Ell. & Ev., on leaves. Calif. (1).
Phoma ilicina Ell. & F.W.Anderson, on twigs. Calif. (1).
P. phacidiella (Cke. & Ell.) Sacc. (*?Physalospora ilicis*), leaf spot. Wash. (1).
Phomopsis sp., dieback. N.J.
P. crustosa Sacc., Bomm., & Rouss.: SEE *Diaporthe eres.*
Phyllosticta sp., leaf spot. Calif., N.J., Wash. (1).
P. opaca Ell. & Ev.—Calif. (4).
Physalospora ilicis (Schleicher ex Fr.) Sacc., leaf spot, ?twig blight. Calif. (1,4); Wash. (1); N.J. (1,3).
P. obtusa (Schw.) Cke., on branches. Calif. (4).
Polyporus adustus Willd. ex Fr. and *P. hirsutus* Wulf. ex Fr., wood rot. Oreg. (1).
Rhizoctonia solani Kuehn, leaf rot of cuttings. Md. (1).
Sphaceloma sp., spot anthracnose. La. (2).
Trochila ilicis (Chev. ex Fr.) Crouan, on leaves. Calif., Wash. (1).
Vialaea insculpta (Fr.) Sacc.: SEE *Boydia insculpta.*

III. Deciduous Species

(1) *Ilex decidua* Walt., possumhaw. Range 16, 17,20,25,28,29,30.
(2) *I. montana* Torr. & Gray, mountain-holly. Range 25,27,28,29.
(3) *I. verticillata* (L.) A.Gray, winterberry. Range 23,24,25,26,27,28,29,30.
(4) Other species.

Small trees (1,2) or shrubs (3), sometimes cultivated for ornament or the fruit branches collected for decorative use; useful to wildlife.

Amerosporium ilicinum Ell. & Ev., on leaves. La. (1).
Cenangella ravenelii (Berk.) Sacc., on twigs. Ala., La. (1,3).
Cuscuta exaltata Engelm., dodder. Tex. (1).
Dendrophoma nigrescens Fairm., on twigs. N.Y. (3).
Dermea peckiana (Rehm) Groves, on twigs. Mich., N.J. (3).
Diaporthe ilicis (Ell. & Ev.) Wehm., on twigs. Mich. (3).
D. oxyspora (Pk.) Sacc.—Ga. (2); N.J. (3).
Gloeosporium niveum J.J.Davis, on leaves. Wis. (3). Associated with *Rhytisma prini.*

Godroniopsis nemopanthis Groves, on twigs. Mich., N.Y. (3).
Microdiplodia ilicigena Fairm., on twigs. N.Y.
Micropera stellata (Ell.) Jacz.: See *Dermea peckiana.*
Microsphaera alni DC. ex Wint., powdery mildew. Ala., Ill. (1); Ala., N.C., Pa. (2); Wis. (3).
Myriangium asterinosporum (Ell. & Ev.) J.H.Miller, on twigs (parasitic on scale insects). Ga. (1,3).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Ill. (1).
Phyllosticta concomitans Ell. & Ev., leaf spot. La.
P. haynaldi Roum. & Sacc.—W. Va. (3).
P. prini Pk.: See *Physalospora ilicis.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora ilicis (Schleicher ex Fr.) Sacc., leaf spot. N.Y. (3).
P. obtusa (Schw.) Cke., on branches. Ga. (2).
Poria inermis Ell. & Ev., wood rot. Md., Mich., Pa. (2).
Ramularia prini Pk., on leaves. Mich., N.Y., Wis. (3).
Rhabdospora ilicigena Fairm., on twigs. N.Y.
Rhytisma spp., tar spot, leaf spot: *R. concavum* Ell. & Kell.—Ohio, Wis. (3). *R. ilicincola* (Schw.) Fr.—Ill., Miss., N.C., Okla., Tex. (1). *R. prini* (Schw.) Fr. (*R. ilicis-canadensis* Schw.)—Ga. (1); N.C. (2); Maine to Miss., Ill., and Wis. (3). *R. velatum* (Schw.) Fr.—Miss., N.C. (1). All of these are perhaps synonyms of *R. prini.*
Septobasidium spp., brown felt: *S. leprosum* Couch—La., N.C. (1); *S. patouillardii* Burt—La. (1).
Sphaeronema peckii Sacc. & Syd.: See *Godroniopsis nemopanthis. S. stellatum* Pk.: See *Dermea peckiana.*

Nemopanthus

N. mucronata (L.) Trel., mountain-holly. Range 21,22,23,24,26,37.

Deciduous shrub or small tree of ornamental value; useful to wildlife.

Dermea peckiana (Rehm) Groves, on twigs. Mich., N.Y.
Durandiella nemopanthis (Pk.) Groves, on twigs. N.Y., Vt.
Godroniopsis nemopanthis Groves, on twigs. N.Y.
Microsphaera alni DC. ex Wint., powdery mildew. N.Y., Wis.
Poria inermis Ell. & Ev., wood rot. Pa.
Ramularia nemopanthis G.W.Clint. & Pk., leaf spot. N.Y.
Rhytisma ilicis-canadensis Schw. (=*R. prini* (Schw.) Fr?), tar spot. Maine to W. Va. and Mich.
Venturia curviseta Pk., on leaves. N.Y.

ARACEAE

Acorus

A. calamus L., sweetflag.

Perennial herb of marshes in the Eastern and Central States and southward, sometimes grown in bog gardens; useful to wildlife. *A. gramineus* Soland, of eastern Asia, also is cultivated.

Cylindrosporium acori Pk., leaf spot. Conn., Kans.
Ramularia aromatica (Sacc.) Hoehn., leaf spot. Conn. to Md., Ind., and Wis.
Septocylindrium sp. (=*Ramularia?*), leaf spot. N.Y.
Sphaerulina acori Dearn. & House, on fading leaves. N.Y.
Uromyces pyriformis Cke. (II,III), rust. Maine to Va., Miss., Ill., and Minn. O and I unknown.

Aglaonema

A. simplex Blume, Chinese evergreen.

Perennial herb of Borneo and Celebes, grown as an indoor foliage plant, usually in water.

Pythium splendens Braun, root rot. Fla.

Anthurium

Anthurium spp.

Perennial herbs of tropical America, several of which are grown in greenhouses for ornamental foliage, but the following records pertain to other species.

Mycosphaerella anthurii Miles, leaf spot. P.R.
Phyllachora engleri Speg., black spot. P.R.
Uredo anthurii (Har.) Sacc. (II), rust. P.R.

Arisaema

(1) *A. dracontium* (L.) Schott, dragonroot.
(2) *A. triphyllum* (L.) Schott (also *A. atrorubens* (Ait.) Blume), Jack-in-the-pulpit, Indian-turnip.

Perennial herbs of moist woodlands, mostly in the Eastern and North Central States and southward; sometimes grown in wild gardens; useful to wildlife.

Botrytis streptothrix (Cke. & Ell.) Sacc., leaf and stalk blight. Ill., Iowa, Md., N.Y., Pa., Wis. The fungus on *Arisaema* is commonly thus identified, but it has recently been made the type of a new genus of Sclerotiniaceae, *Streptotinia arisaemae* Whet.
Cladosporium sp., leaf mold. Va. (2).
Uromyces caladii (Schw.) Farl. (O,I,II,III), rust. N.Y. to Fla., Tex., and Nebr. (1); Maine to Fla., Miss., and N. Dak.; also Pacific Northwest (2). The name *U. ari-triphylli* (Schw.) Seeler is favored by some authors because based on the III stage.
Volutella sp. (=*Ramularia arisaematis* Ell. & Dearn.?), leaf spot. Ind. (2).

Caladium

(1) *C. bicolor* Vent.
(2) Other species.

Tropical American herbs grown for ornamental foliage in gardens in the Far South, in greenhouses and as house plants in the North.

Cercospora caladii Cke., leaf spot. P.R. (1).
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. Fla. (1,2).
Gloeosporium sp. (*?G. thuemenii* Sacc.), leaf spot. Fla.
Helminthosporium caladii F.L.Stevens, leaf spot. P.R. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla., Miss. (1).
Sclerotium rolfsii Sacc., southern blight. Fla., P.R. (1,2).

Calla

C. palustris L., wild calla.

Perennial herb of bogs in the Northeastern and Lakes States, sometimes grown in wild gardens; useful to wildlife.

Cercospora callae Pk. & G.W.Clint., leaf spot. Mass., N.Y., Wis.
Marssonina (*Marssonia*) *callae* Dearn. & House, leaf spot. N.Y.

Colocasia

(1) *C. antiquorum* Schott, elephants-ear.
(2) *C. esculenta* (L.) Schott, taro, dasheen.

Coarse herbs of tropical Asia, grown for ornament and, especially (2), for edible tubers; an important food plant in the Hawaiian and other Pacific Islands.

Cercospora sp. (*?C. caladii* Cke.), leaf spot. T.H. (2).
Cladosporium sp., leaf mold. T.H. (2).
Diplodia sp., black rot of tubers. Fla., S.C., Tex. (2). Probably *D. tubericola* (Ell. & Ev.) Taub. (conidial stage of *Physalospora rhodina* (Berk. & Curt.) Cke.), or this species under other names.
Erwinia carotovora (L.R.Jones) Holland and *E. aroideae* (Town.) Holland, bacterial soft rot. Fla., Tex., P.R. (2).
Fusarium solani (Mart.) Appel & Wr., powdery gray rot. Fla., Tex., T.H. (2).
Gloeosporium sp. (*?G. thuemenii* Sacc.), leaf spot. Guam (2).
Helminthosporium caladii F.L.Stevens, leaf spot. P.R. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla., Tex., T.H. (2).
Phyllosticta colocasiicola Hoehn., leaf spot. P.R. (2).
P. colocasiophila Weedon—Guam, T.H. (2).
Phytophthora colocasiae Rac., leaf blight. T.H. (2).
Pythium debaryanum Hesse, root rot. Calif., T.H. (2).
Sclerotium rolfsii Sacc., southern blight, stem rot. Fla. (1,2); N.Y. (1); Tex., T.H. (2).

Dieffenbachia

(1) *D. picta* Schott
(2) *D. seguine* (Jacq.) Schott

Perennial, somewhat woody herbs of tropical America, grown for ornamental foliage in the open in the South and as house plants in the North.

Cephalosporium dieffenbachiae Linn, leaf spot. N.Y. (1).
Colletotrichum (*Gloeosporium*) sp., anthracnose. SEE *Glomerella*.
Glomerella cincta (Ston.) Spauld. & Schrenk (=*G. cingulata* (Ston.) Spauld. & Schrenk?), leaf spot. N.J. (1). Reported in conidial stage as *Colletotrichum* or *Gloeosporium* sp.
Irenina aracearum F.L.Stevens, black mildew. C.Z.
Meliola dieffenbachiae F.L.Stevens, mildew. P.R. (2).
Phyllosticta colocasiae Hoehn., leaf spot. P.R. (2).
Phytophthora palmivora Butl., stem rot. Calif. (1).
Phythium splendens Braun, root rot. Fla. (1).
Xanthomonas dieffenbachiae (McCul. & Pirone) Dows., bacterial leaf rot. N.J. (1).

Homalomena

H. wallisii (Mast.) Regel

Tropical American herb grown as a pot plant for ornamental foliage.

Glomerella cincta (Ston.) Spauld. & Schrenk, leaf spot. N.J.

Monstera

M. deliciosa Liebm., ceriman.

Woody climber of Central America, grown for novelty in greenhouses and sometimes as a house plant; the fruit is edible.

Macrophoma philodendri Pk., leaf spot. Fla., Mich.

Nephthytis

N. afzelii Schott

Perennial herb of western Africa, grown in greenhouses or as a house plant for ornament.

Cephalosporium sp., leaf spot. Md.
Pythium splendens Braun, root rot. Fla.

Orontium

O. aquaticum L., goldenclub

Aquatic perennial of the Eastern and Gulf States, sometimes grown in wild gardens; useful to wildlife.

Botrytis streptothrix (Cke. & Ell.) Sacc., leaf blight. N.J. See note under *Arisaema*.
Mycosphaerella sp., leaf spot. N.J.
Phyllosticta orontii Ell. & Martin, leaf spot. N.J., Tex.
Physalospora orontii Ell. & Ev., on leaves. N.J.
Ramularia orontii Ell. & Martin, leaf spot. N.J.
Volutella diaphana Ell., leaf spot. N.J.

Peltandra, arrow-arum

(1) *P. glauca* (Ell.) Feay
(2) *P. virginica* (L.) Kunth.

Perennial herbs of bogs: (1) in the Southeastern and Gulf States, (2) ranging northward to New York and Michigan; grown for ornament in wild gardens; useful to wildlife.

Cercospora callae Pk. & G.W.Clint. (*C. pachyspora* Ell. & Ev.), leaf spot. Ala. (1); Del., Fla., N.Y. (2).
Colletotrichum sp., leaf spot. Ala. (1).
Gloeosporium paludosum Ell. & Gall., leaf spot. Del., Ind., Mass., N.Y. (2).
?Laestadia ari Ell. & Ev., on leaves. Ala. (1).
Pestalotia aquatica Ell. & Ev., secondary leaf spot. N.J., N.Y. (2).
Ramularia sp., leaf spot. Mich. (2).
Sclerotium caladii Schw. ex Fr., on leaves. Md., Mass., N.C.
Uromyces caladii (Schw.) Farl., (O,I,II,III), rust. Ga., N.C. (1); Mass. to Fla., also Ill., Ind., Iowa (2). See note under *Arisaema*.

Philodendron

Philodendron spp.

Woody climbers of tropical America, a number of which are cultivated as foliage plants in greenhouses and general indoor use, also in the open in the Far South.

Colletotrichum philodendri P. Henn., leaf spot. N.J., C.Z., P.R.
Diplodia theobromae (Pat.) Nowell, on stems. C.Z.
Meliola philodendri F.L.Stevens, black mildew. P.R.
Scolecopeltella microcarpa Speg., on leaves. P.R.
Trichopeltis reptans (Berk. & Curt.) Speg., on leaves. P.R.

Pothos

See *Scindapsus.*

Scindapsus, ivy-arum

(1) *S. aureus* Engler (*Pothos aureus* Linden ex André)
(2) *S. pictus* Hassk., especially var. *argyraeus* Engler

Woody vines of the East Indies, grown for ornament in greenhouses and often as house plants, usually under the name *Pothos.*

Phyllosticta aricola Weedon and *P. pothicola* Weedon, leaf spot. T.H.
Pythium splendens Braun, root rot. Fla.

Symplocarpus

S. foetidus (L.) Nutt., skunkcabbage.

Perennial herb of swampy ground in the Northeastern and North Central States, sometimes grown in wild gardens; useful to wildlife.

Botrytis sp., (*?B. streptothrix* (Cke. & Ell.) Sacc.), leaf blight. Conn., Ill., N.J., N.Y.
Cercospora symplocarpi Pk., leaf spot. Mass. to Va., Ind., and Wis.
Septoria spiculosa Ell. & Holw., leaf spot. Md., N.Y., Pa., Wis.

Syngonium

S. podophyllum Schott

Mexican creeping vine, grown in greenhouses for ornament.

Cephalosporium cinnamomeum Linn, leaf spot. N.Y.

Xanthosoma

(1) *X. sagittaefolium* (L.) Schott, yautia.
(2) *X. violaceum* Schott, malanga.
(3) Other species.

Large herbs of tropical America bearing edible tubers, also grown in greenhouses for foliage.

Armillaria mellea Vahl ex Fr., root rot. Calif.
Colletotrichum (*Gloeosporium*) sp., leaf spot. P.R. (1,2).
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. P.R. (1).
Fusarium solani (Mart.) Appel & Wr., powdery gray rot. Fla. (1).
Phyllosticta colocasiae Hoehn., leaf spot. P.R.
Sclerotium rolfsii Sacc., southern blight. P.R. (1,2).
Vasculomyces xanthosomae Ashby, ? mal de la yautia (root disease). P.R. (1).
MOSAIC—unidentified virus. P.R. (1).

Zantedeschia, calla

(1) *Z. aethiopica* Spreng., common calla.
(2) *Z. elliottiana* Engler, golden calla.
(3) *Z. rehmannii* Engler, pink calla.

Perennial herbs, from corms or rhizomes ("bulbs"), of South Africa; widely grown in greenhouses for cut flowers and as pot plants, especially (1); also as an outdoor crop in California, Florida, and Texas.

Alternaria sp. (*?A. tenuis* Nees ex Cda.), secondary leaf spot. Calif., N.J., N.Y., Oreg. (1).
Armillaria mellea Vahl ex. Fr., root rot. Calif. (1).
Botrytis cinerea Pers. ex Fr., gray-mold blight. N.J., Alaska (1).
Cercospora richardiaecola Atk., leaf spot. Ala., Miss. (1).
Coniothecium richardiae (Mercer) Jauch, leaf spot. Calif., Fla., Mass., N.J., N.Y., Oreg., T.H. (1).
Erwinia aroideae (Town.) Holland and *E. carotovora* (L.R.Jones) Holland, bacterial soft rot of rhizomes, leafstalk rot. General (*).
Gloeosporium callae Oud., leaf spot. Wash. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Calif., Fla. (1).
Phoma sp., dry rot (of rhizomes). Calif., Oreg. (1).
Phyllosticta richardiae Hals. (nomen nudum): SEE *Coniothecium richardiae.*
Phytophthora cryptogea Pethyb. & Laff. var. *richardiae* (Buis.) Ashby, root rot. Calif., Fla., Ill., Ind., Mass., N.J., N.Y., Ohio, Oreg., Pa., Wash. (1).
P. erythroseptica Pethyb., rhizome rot. Calif. (1,3).
Rhizoctonia solani Kuehn, root rot, seed rot. Calif. (2).
Sclerotium rolfsii Sacc., southern blight. Calif., Fla., Oreg. (1).
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Ill., Ind., Md., N.Y., Oreg., Tex., Wash. (*).
CHALKY ROT—cause unknown but believed physiological, due to immaturity of rhizomes. Calif., Oreg., and in commercial stocks.

ARALIACEAE

Acanthopanax

A. sieboldianus Mak.

Shrub of Japan, grown for ornament, zone 4.

Alternaria sp. (*?A. panax* Whet.), leaf spot. Mo.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Aralia

A. cordata Thunb., udo.

Robust perennial herb of Japan, sometimes grown for edible shoots.

Alternaria sp. (*?A. panax* Whet.), blight. Del., ?N.J.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Md.
Verticillium albo-atrum Reinke & Berth., wilt. Md., ?Pa.

(1) *Aralia hispida* Vent., bristly sarsaparilla.
(2) *A. nudicaulis* L., wild sarsaparilla.
(3) *A. racemosa* L., American spikenard.

Perennial herbs of woodlands, mostly in the

Northeastern and North Central States; collected or grown for pharmaceutical uses and sometimes planted for ornament; useful to wildlife.

Alternaria sp., leaf spot. N.Y. (2,3).
Ascochyta marginata J.J.Davis, leaf spot. Wis. (2).
Cercospora leptosperma Pk., leaf spot. Mich., Wis. (1); Iowa, Mich., N.Y., Wis. (2).
Nyssopsora clavellosa (Berk.) Arth. (III), rust. Minn., N.Y., Tex. (1); Maine to Pa., Minn., and Oreg., also Calif. (2); Oreg. (3).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Mich., Nebr. (2).
Phyllosticta decidua Ell. & Kell., leaf spot. Wis. (3).
Ramularia repens Ell. & Ev., leaf spot. Wis. (2,3).
Sclerotium deciduum J.J.Davis, leaf spot. Wis. (2).
Septoria macrostoma Clements, on leaves. Colo. (2).
Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (3).

Aralia spinosa L., Hercules-club.

Small tree of the Eastern and Central States and southward, sometimes grown for ornament, zone 4; useful to wildlife.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., branch canker, dieback. Ga., Va., W. Va.
Cercospora atromaculans Ell. & Ev., leaf spot. La., Tex.
Diaporthe araliae Ell. & Ev., on branches. Ga., W. Va.
Haplosporella araliae Ell. & Ev., on branches. W. Va. Perhaps the conidial stage of *Physalospora obtusa* (Schw.) Cke.
Nectria cinnabarina Tode ex Fr., canker, dieback. Va., W. Va.
Phomopsis melaleuca (Berk. & Curt.) Grove, on twigs. Ala., W. Va.
Phyllosticta araliae Ell. & Ev., leaf spot. Tex.
P. everhartii Sacc. & Syd., leaf spot. Tex., W. Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Polyporus tulipiferus (Schw.) Overh., sapwood rot. Md.
Rhizoctonia solani Kuehn, root rot. Tex.
Sphaceloma araliae Jenkins, spot anthracnose. Md., Mo.
Stagonospora sp., leaf spot. W. Va.

Hedera

H. helix L., English ivy.

Woody evergreen vine or climbing shrub of Europe and southwestern Asia; widely cultivated in many horticultural forms for wall and ground cover, zone 5; also as a house plant.

Amerosporium trichellum (Fr.) Lind (*Colletotrichum trichellum* (Fr.) Duke, *Vermicularia trichella* Fr.), anthracnose, leaf and stem spot. Mass. to S.C., Tex., and Okla., also Oreg., Wash. *Colletotrichum gloeosporioides* Penz. var. *hederae* Pass. and C. *hedericola* Laubert are probably synonyms.
Cladosporium brunneolum Sacc., leaf mold. Calif.
C. punctulatum Sacc. & Ell.—Calif.
Colletotrichum trichellum (Fr.) Duke: SEE *Amerosporium trichellum.*
Cuscuta sp., dodder. Ariz., N.J.
Diplodia hederae Fckl., on dead stems. Conn., S.C., Va.
Erysiphe cichoracearum DC., powdery mildew. Okla.
Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf spot, dieback. Conn., Md., N.Y., Tex. Probably includes *Gloeosporium hedericola* Maubl., reported in N.Y.
Macrophoma sp. (*?Sphaeropsis*), leaf spot. Tex.
Phyllosticta concentrica Sacc., leaf spot. Mass. to Ala., Tex., and Nebr.; Calif., Wash.
P. hederae Sacc. & Roum.—Del., N.Y.
P. hedericola Dur. & Mont.—Calif., Conn., Miss., N.J., N.Y., Oreg.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on stems. Md.
Ramularia hedericola Heald & Wolf, leaf spot. Tex.
Rhizoctonia solani Kuehn, root rot (seedlings). Conn.
Sphaceloma hederae Bitanc. & Jenkins, scab, spot anthracnose. Calif., N.C., Va.
Sphaeropsis hedericola (Speg.) Sacc. (*S. hederae* Ell. & Ev.), leaf spot, also on stems. N.Y., W. Va.
Xanthomonas hederae (Arn.) Dows., bacterial spot. Ga., Ill., Md., N.J., N.Y., Va., Wash.

Oplopanax

O. horridum (Small) Miq., devilsclub.

Large thorny shrub of the Pacific coast from California to Alaska; useful to wildlife.

Botrytis cinerea Pers., gray-mold blight. Alaska.
Cercospora daemonicola Sprague, leaf spot. Oreg.

Panax

(1) *P. quinquefolium* L., American ginseng.
(2) *P. trifolium* L., dwarf ginseng.

Perennial herbs of woodlands in the Northeastern and Central States; (1) is cultivated for the rhizomes which are used pharmaceutically.

Alternaria panax Whet., alternaria blight, root rot. General, especially in cultivated plantings, Maine to N.C., Mo., and Minn. (1).
Armillaria mellea Vahl ex Fr., root rot. Wash. (1).
Botrytis cinerea Pers. ex Fr., gray-mold blight, stem rot, seed rot. N.Y. to N.C. and Mich.; Wash. (1).
Colletotrichum dematium (Fr.) Grove, secondary leaf spot. N.Y. to N.C., Mo., and Minn. (1).
Fusarium scirpi Lambotte & Fautr., and its var. *acuminatum* (Ell. & Ev.) Wr., root rot, wilt. N.Y. to Ala., Mo., and Wis.; Wash. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Conn., Mich., N.Y., Ohio, Pa., Wis. (1).
Phytophthora cactorum (Leb. & Cohn) Schroet., root and stem rot, downy mildew. Conn. to N.C., Iowa, and Mich.; Wash. (1).
Puccinia araliae Ell. & Ev. (III), rust. Mass., Pa. (2).
Pythium debaryanum Hesse, damping-off. N.Y. (1).
Ramularia spp., "rust," root rot. Superficial discoloration of roots (rhizomes) ascribed to *R. destructans* Zinss. is reported in Mich., N.Y., Oreg., Wash., Wis. (1); "disappearing root rot," ascribed to *R. panacicola* Zinss., is reported in N.Y. and Wis. (1). Both species appear to belong to *Cylindrocarpon*, but no combinations with this have been made.
Rhizoctonia solani Kuehn, damping-off, root rot. Ark., Ind., Mich., N.J., N.Y., Wash. (1).
Sclerotinia sclerotiorum (Lib.) d By., white rot of rhizomes. Mich., N.Y., Ohio, Pa., Wis. (1).
S. smilacina Durand (*S. panacis* Rankin), black rot of rhizomes. Mich., Minn., N.Y., Wis. (1).
Septoria sp., leaf spot. Minn. (1).
S. araliae Ell. & Ev.—Wis. (2).

Thielaviopsis basicola (Berk. & Br.) Ferr., black root. Ill., Mich., N.J., N.Y., Ohio (1).
Verticillium albo-atrum Reinke & Berth., wilt. Ind., Ky., Mich., N.J., N.Y., Ohio, Pa., Tenn., Wis. (1).
PAPERY LEAF—physiological, ascribed to moisture deficiency and sunscald. Mich., Mo., N.J., N.Y., Pa. (1).

Polyscias

(1) *P. fruticosa* (L.) Harms

(2) *P. guilfoylei* Bailey

Shrubs of southern Asia and Pacific Islands, grown for ornament in greenhouses, and for hedges in the Far South.

Cephaleuros virescens Kunze, green scurf. P.R. (2).
Colletotrichum peregrinum Pass., leaf spot. C.Z. (2).
Rosellinia bunodes (Berk. & Br.) Sacc., root rot. P.R. (1).

ARISTOLOCHIACEAE

Aristolochia

(1) *A. clematitis* L., birthwort.
(2) *A. durior* Hill (*A. sipho* L'Her.), Dutchmans-pipe.
(3) *A. serpentaria* L., Virginia snakeroot.

Perennial herbs (1,3) or woody vine (2); native in the Eastern and Central States (2,3) or introduced from Europe and locally naturalized (1); all may be grown for ornament, especially (2) which is often grown as a plant cover.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Conn., Md. (2).
Cercospora guttulata Ell. & Kell., leaf spot. W. Va. (2); Ill. (species not designated).
C. serpentariae Ell. & Ev., leaf spot. Ala., Conn., Del. (3).
Diplodia radicicola Tassi, root rot. Va. (3). Probably the conidial stage of *Physalospora rhodina* (Berk. & Curt.) Cke.
Gloeosporium sp. (*?Glomerella cingulata* (Ston.) Spauld. & Schrenk), leaf spot. Mass. (2).
Hymenochaete tabacina (Sow. ex Fr.) Lév., on dead branches. Calif.
Ovularia aristolochiae Dearn., leaf spot. W. Va. (2).
Phyllosticta aristolochiae Tassi, leaf spot. N.J. (2).
Physalospora obtusa (Schw.) Cke., on stems. Ohio (1).
Sphaeropsis squieriae G.W. Clint., on stems. N.Y.

Asarum

(1) *A. canadense* L., wildginger.
(2) *A. caudatum* Lindl.
(3) *A. virginicum* L.

Perennial herbs of woodlands: (1) in the Eastern and Central States, (2) in the Far West, (3) in the Southeast; sometimes grown in wild gardens.

Ascochyta versicolor Bub., leaf spot. Idaho (2).
Laestadia asarifolia (Cke.) Sacc., leaf spot. S.C.
Mycosphaerella sp. (*Sphaerella concentrica* (Berk. & Curt.) Cke.), on leaves. Ala. (3).
Puccinia asarina G.Kunze (III), rust. Calif., Idaho, Oreg., Wash. (2).
Sclerotinia sclerotiorum (Lib.) d By., rhizome rot. N.Y. (1).
Synchytrium asari Arth. & Holw., leaf gall. Minn., Wis. (1); Calif.

ASCLEPIADACEAE

Ampelanus

A. *albidus* (Walt.) Britton (*Gonolobus laevis* Michx.), sandvine.

Perennial vine of woodlands in the Southeastern States north to Pennsylvania and Iowa; a minor honey plant, sometimes a troublesome weed.

Cercospora gonolobi Ray, leaf spot. Okla.
Meliola bidentata Cke., black mildew. N.C.
Plasmopara gonolobi (Lagh.) Swing., downy mildew. S.C.
Puccinia obliqua Berk. & Curt. (III), rust. Okla., Tex.
Septoria sp., leaf spot. La.

Asclepias, milkweed

(1) *A. tuberosa* L., butterflyweed.
(2) *A. speciosa* Torr.
(3) *A. galioides* H.B.K.
(4) *A. incarnata* L., swamp milkweed.
(5) *A. syriaca* L., common milkweed.
(6) Other species.

Perennial herbs of dry fields, meadows, or swamps, throughout the United States: some are grown for ornament (1,2); others are minor honey plants, especially (1) and (5); some are reputedly poisonous to livestock (3); most are useful to wildlife.

Alternaria sp., leaf spot. Vt. (4); Mich., W. Va. (5); S.C. (6).
Ascochyta asclepiadis Ell. & Ev., leaf spot. Del. (5).
Cercospora asclepiadorae Ell. & Kell., leaf spot. Ala., Tex. (1); Del., Kans., S.C. (6).
C. clavata (Gerard) Pk.—General, especially in the Central and Western States; commonly on (5), also on (1,2,4).
C. elaeochroma Sacc. (=*C. clavata?*)—N. Dak. (2,5), Wis. (6).
C. hanseni Ell. & Ev.—Calif. (5,6).
C. illinoensis Barth.—Ill., Mass., N.Y. (5).
C. incarnata Ell. & Ev.—Ohio (4), Wis. (6).
C. venturioides Pk.—Wash. (2); Ind., Iowa, Mo., N.Y., Tex. (5); Fla., N.C., N.Y., Tex., P.R. (6). Perhaps a synonym of *C. clavata*.
Colletotrichum fusarioides (Ell. & Kell.) O'Gara: SEE *Glomerella fusarioides*.
Diaporthe arctii (Lasch) Nits., on stems. N.J. (1); Iowa, W. Va. (5); Ga. (6).
Didymella cornuta Ell. & Ev., on stems. N.Y. (5).
Diplodia asclepiadea Cke. & Ell., on stems. N.J. (5).
Erysiphe cichoracearum DC., powdery mildew. Ohio (5); Ill., P.R. (6).
Glomerella fusarioides Edg., anthracnose, leaf and

stem blight. N. Mex., Utah (2); Kans., Mass., Mont., N.J., N.Y., Pa., Tex. (5).
Phoma asclepiadea Ell. & Ev., stem blight. Utah (2); N.Y., W. Va. (5); Tex. (6).
Phomopsis missouriensis Bub., on stems. Mo. (6).
Phyllactinia corylea Pers. ex Karst., powdery mildew. N.Y. (5).
Phyllosticta cornuti Ell. & Kell., leaf spot. Ill., Kans., Mich. (5).
P. tuberosa Ell. & Martin—Ill., N.J. (1); Del. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,5,6).
Pleospora diplospora Ell. & Ev., on stems. Kans. (4).
Puccinia bartholomaei Diet. (O,I), rust. Widespread, especially in the Central and Western States (1,2, 3,5,6). II and III on *Bouteloua* sp.
P. concrescens Ell. & Ev. (III)—P.R. (6).
P. seymouriana Arth. (O,I)—N. Dak., S. Dak. (2); Mo., Wis. (5); N.Y. (6). II and III on *Spartina* spp.
P. vexans Farl. (O,I)—Wis. (1). II and III on *Bouteloua curtipendula*.
Pyrenophora depressa Pk., on stems. Calif. (6).
Rhizoctonia solani Kuehn, root rot. Tex. (5,6).
Rhodochytrium spilanthidis Lagh. var. *asclepiadis* Farl., on leaves. Kans. (6).
Rosellinia aquila DeN., root rot. Tex. (6).
Scolecotrichum asclepiadis Ell. & Ev., on leaves. Mich. (5), Calif. (6).
Septoria asclepiadicola Ell. & Ev., leaf spot. N.Y. to W. Va., Okla., and Wis. (4); Pa. (5); Md., Mo. (6).
?S. cryptotaeniae Ell. & Rau—Iowa (4,5), Tex. (5,6).
S. incarnata Ell. & Ev.—Kans. (4), Ind. (5).
Sphaeropsis sphaerospora Pk., on stems. N.Y. (5).
Stagonospora zonata J.J.Davis, leaf spot. Wis. (5).
Uromyces asclepiadis (Schw.) Cke. (II,III), rust. Widespread on the species listed, and others, throughout their respective ranges from Maine to Florida, Texas, and South Dakota. O and I unknown.
MOSAIC—virus. In part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm., reported in Fla., Ill., Iowa, Ky., Md., Mich., N.J., N.Y., Wis. (5,6); in part not identified.
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Wis. (5).

Asclepiodora

(1) *A. decumbens* (Nutt.) A.Gray
(2) *A. viridis* (Walt.) A.Gray

Perennial herbs of dry plains, chiefly in the South Central and Southwestern States, (2) also may be grown in wild gardens in the Southeastern States.

Alternaria fasciculata (Cke. & Ell.) L.R.Jones & Grout, leaf spot (?secondary). Okla. (2).
Cercospora asclepiadorae Ell. & Kell., leaf spot. Kans. (2).
Phyllosticta tuberosa Ell. & Martin, leaf spot. Okla. (1).
Puccinia bartholomaei Diet. (O,I), rust. Okla., Tex. (1); Kans., Okla. (2). II and III on *Bouteloua* spp.
Uromyces asclepiadis (Schw.) Cke. (II,III), rust. N. Mex., Tex. (1); Kans. (2).

Philibertia

(1) *P. clausa* Jacq.
(2) Other species.

Twining perennial herbs of the Far South, sometimes grown for ornament.

Phyllactinia corylea Pers. ex Karst., powdery mildew. Fla. (2).
Puccinia bartholomaei Diet. (O,I), rust. Ariz. (2).
P. obliqua Berk. & Curt. (III)—Fla. (1), Ariz., Calif., N. Mex., Tex. (2).

Vincetoxicum, milkvine

(1) *V. gonocarpos* Walt., anglepod milkvine.
(2) Other species.

Perennial climbing vines, chiefly in the Southeastern and South Central States.

Cercospora bel'ynckii (West.) Sacc., leaf spot. Tex. (2).
C. vincetoxici Ell. & Ev.—Ala., Tex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Plasmopara gonolobi (Lagh.) Swing., downy mildew. Miss. (1); Md. to Fla. and Tex. (2).
Puccinia obliqua Berk. & Curt. (III), rust. Miss., S.C. (1); Fla. to Ky., Okla., and Ariz. (2).
Uromyces asclepiadis (Schw.) Cke. (II,III), rust. W. Va. (1), Ind. (2).

BALSAMINACEAE

Impatiens

I. Cultivated Species

(1) *Impatiens balsamina* L., garden balsam.
(2) *I. sultanii* Hook. f. (or sometimes *I. holstii* Engler & Warb.), sultan balsam.

Annual herb of southeastern Asia (1), or perennial of eastern Africa (2), widely cultivated for ornament; (2) as an annual or under glass.

Cercospora fukushiana Matsuura & Yamamoto, leaf spot. Kans., ?Fla. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes (1).
Phyllosticta sp., leaf spot. N.J. (2).
?Pseudomonas solanacearum E.F.Sm., bacterial wilt. Wis. (1).
Pythium sp., damping-off. Wash. (2).
Rhizoctonia solani Kuehn, damping-off. Fla. (1).
Sclerotium rolfsii Sacc., stem rot. Ill. (2).
Septoria noli-tangeris Gerard, leaf spot. Ohio (1).
Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (1).

II. Native Species, Jewelweed, Touch-Me-Not

(1) *Impatiens biflora* Walt.
(2) *I. pallida* Nutt.

Annuals of moist waste ground, throughout the Eastern and Central States and southward, (2) more frequent northward; useful to wildlife.

Cuscuta spp., dodder. Widespread (1,2).
C. gronovii Willd.—N.Y.
Discosia maculicola Gerard, leaf spot. N.Y. (1).
Gloeosporium impatientis H.W.Anderson, leaf spot. Ill., Ind. (1).

Mycosphaerella impatientis (Pk. & G.W.Clint.) House, on leaves. Iowa, N.Y., Vt., Wis. (1); Iowa, Va. (2).

Phomopsis impatientis Dearn. & House, on stems. N.Y. (1).

Plasmopara obducens Schroet., downy mildew. Mass. to Md., Ind., and Minn. (1); N.Y. to Ala., Mo., and Wis. (2).

Puccinia argentata (Schultz) Wint. (II,III), rust. Mass. to Ga., Miss., Iowa, and Minn. (1); Ill., Ind., Iowa, N.Y., Tenn. (2). O and I on *Adoxa moschatellina* L.

P. rubigo-vera (DC.) Wint. var. *impatientis* (Arth.) Mains (O,I), rust. General (1,2). II and III on grasses, mostly *Agrostis* and *Elymus* species. Several special forms as *graminicola, similis,* and *singularis* within this variety have been designated by Mains.

Pythium paroecandrum Drechs., rootlet rot. Md. (2).

Ramularia impatientis Pk., leaf spot. Vt. to Md., Nebr., and Minn. (1,2).

Septoria noli-tangeris Gerard, leaf spot. Mass. to Ohio, Ill., and Wis. (1); Iowa, W. Va. (2). Associated with *Mycosphaerella impatientis,* perhaps its conidial stage.

BASELLACEAE

Basella

B. rubra L., Malabar-nightshade.

Annual or biennial vine of tropical Asia, grown in warm regions for edible leaves.

Acrothecium basellae Alvarez Garcia (=*Curvularia* sp.?), leaf and stem spot. P.R.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes.

Rhizoctonia sp., secondary stem rot. P.R.

BEGONIACEAE

Begonia

(1) *B. semperflorens* Link & Otto
(2) *B. rex-cultorum* Bailey
(3) *B. tuberhybrida* Voss
(4) Others.

A large assemblage of cultigens derived from succulent herbs of tropical origin, much modified by hybridization and selection. Those listed are groups of related forms rather than botanical species, and correspond approximately to the horticultural types of begonias, as fibrous rooted, rhizomatous, and tuberous rooted.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Widely used in experimental inoculations, natural infection reported in Conn., Miss., Tex. (4).

Aphelenchoides olesistus (Ritz.-Bos) Steiner & Buhrer, leaf nematode. Cosmopolitan in greenhouses, reported from Calif., Conn., ?Ill., Mass., Mich., N.J., N.Y., Pa., Wash. (1,2,4).

Armillaria mellea Vahl ex Fr., root rot. Calif. (3).

Bacterium flavozonatum McCul.: See *Xanthomonas begoniae.*

Botrytis cinerea Pers. ex Fr., gray-mold blight. Cosmopolitan, especially in propagation (1,2,4).

?Cercospora sp., leaf spot. Fla., Ga., Miss., N.J., Tex. (1); N.J. (2). So reported but not confirmed; may be *Alternaria* or other fungi following bacterial spot or oedema.

Erysiphe cichoracearum DC., powdery mildew. Calif. (3).

Gloeosporium sp. (sometimes reported as *G. begoniae* Magnaghi), leaf spot, anthracnose. Fla., La., Mass., Miss., Tex. (4); N.J. (2). Perhaps a conidial stage of *Glomerella cingulata* (Ston.) Spauld. & Schrenk.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Cosmopolitan, in greenhouses in the North, in the open in the South (1,2,4), Calif. (3).

Oidium sp., powdery mildew. Fla., N.C. (4).

Omphalia flavida (Cke.) Maubl. & Rangel, leaf spot. P.R. (4).

Penicillium bacillosporium Swift, leaf spot (?secondary). N.Y. (4).

Phyllosticta sp., leaf spot. N.J. (2,4), Pa. (4).

Pythium spp., root and stem rot, damping-off, leaf rot: *P. debaryanum* Hesse—Mo., N.Y. (1,3); R.I. (4). *P. intermedium* d By.—Calif., N.J., N.Y. (3). *P. splendens* Braun—Mo. (1). *P. ultimum* Trow—Calif., Mo., N.J., N.Y. (1,3).

Rhizoctonia solani Kuehn, root and stem rot, sometimes leaf rot. Cosmopolitan.

Sclerotinia sclerotiorum (Lib.) d By., stem rot. Calif. (3).

Sclerotium rolfsii Sacc., stem rot. Ill. (4).

Sphaeropsis begoniicola Ell. & Ev., on leaves. Ala. (4).

Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Mass., Ohio (1).

Verticillium albo-atrum Reinke & Berth., wilt. Conn., N.Y. (4).

Xanthomonas begoniae (Buchw.) Dows. (*?X. flavozonatum* (McCul.) Dows.), bacterial spot. Calif., Colo., Ga., Mass., Md., N.J., N.Y., Oreg., Tex., Wis., probably general (1,2,4); Calif., N.J., N.Y., Oreg. (3).

Spotted wilt — virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Mo. (3).

Oedema (water soaked spotting of leaves)—physiological. Frequent in house-plant culture, occasional in greenhouses.

BERBERIDACEAE

Achlys

A. triphylla (Smith) DC., vanillaleaf.

Small perennial herb of north Pacific coast, grown in rock gardens.

Ascochyta achlyicola Ell. & Ev., leaf spot. Wash. Perhaps a growth stage of the following.

Stagonospora achlydis (Dearn.) Sprague, leaf spot. Oreg.

Berberis, barberry

I. Cultivated Species, Introduced

(1) *Berberis thunbergii* DC., Japanese barberry.
(2) *B. vulgaris* L., European barberry.
(3) Other species.

Deciduous (1,2) or sometimes evergreen (3) shrubs of Europe (1) or Asia (2,3): (1) cultivated for ornament, and sometimes escaped, zone 3; (2) cultivated for ornament and fruit, and formerly widely naturalized in the Northeastern and North Central States, now largely eradicated in the latter for protection against stem rust of cereals. Numerous other species, chiefly Asiatic, some South American, are cultivated; hardy to zone 5.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., canker, dieback. Fla.
Botrytis cinerea Pers. ex Fr., gray mold on flowers or leaves. Calif. (2); Mo. (3).
Coniothyrium insitivum Sacc., on twigs. Nebr., Wis. (2).
Cucurbitaria berberidis Pers. ex S.F.Gray, on branches. Maine, N.Y., S.C. (2); Wash. (3).
Cumminsiella sanguinea (Pk.) Arth. (O,I,II,III), rust. Oreg. (3).
Diaporthe detrusa (Fr.) Fckl., on branches. Mass. (2), Md. (3).
Diplodia berberidina Sacc., on twigs. N.Y. (2).
Dothidella berberidis (Wahl.) Th. & Syd., on branches, ?gall. Mass. (2), Wash. (3).
?Gloeosporium berberidis Cke., leaf spot. Conn., Mass., Minn., Ohio, Wis. (2); Minn. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
?Laestadia angulata (Fckl.) Sacc., on leaves. Calif.
Leptosphaeria berberidis Richon, on twigs, ?dieback. Iowa (2).
Meloidogyne sp., root knot nematodes. Va. (1,2); Calif., Md. (3).
Mycosphaerella berberidis (Auers.) Lindau, on leaves. N.Y. (1).
Phoma berberina Sacc. & Roum., on berries. Mass. (1). On twigs—Iowa (2).
Phomopsis sp., on twigs. N.Y. (3). In part probably *Diaporthe detrusa*.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Mass., Vt. (2).
Phyllosticta berberidis Rabh., leaf spot. Ky. (2).
P. japonica Thuem.—Alaska (1). Perhaps the conidial stage of *Mycosphaerella berberidis*.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Poria punctata (Fr.) Cke., heart rot. Md. (2).
Pseudomonas berberidis (Thornberry & H.W.Anders.) Stapp, bacterial spot. General (1); occasional (2); Mich., N.Y., Pa. (3), including deciduous and evergreen species.
Puccinia graminis Pers. (O,I), rust. General (2); also on various other cultivated species, except (1). II and III on cereals and grasses. For a complete list of suscepts see U. S. Dept. Agr. Tech. Bul. 300.
Pythium debaryanum Hesse, damping-off. Calif. (3).
Rhizoctonia solani Kuehn, root rot. Conn. (2).
Stagonospora berberidina Sacc., on leaves. N.Y. (2).
Verticillium albo-atrum Reinke & Berth., wilt. Conn. to Va., Ill., and Mich. (1); Conn. (2).

II. Native Species

(1) *Berberis canadensis* Pursh, Allegany barberry. Range 25,27,28.
(2) *B. fendleri* A. Gray, Colorado barberry. Range 11,13,14.

Deciduous shrubs, noneconomic.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Puccinia graminis Pers. (O,I), rust. Mass., N.Y., Va., W. Va. (1); Colo., N. Mex. (2).
P. koeleriae Arth. (O,I), rust. Colo. (2). II and III on *Koeleria cristata*.
P. montanensis Ell. (O,I), rust. Colo., N. Mex. (2). II and III on *Agropyron*, *Elymus*, and other native grasses.

Caulophyllum

C. thalictroides (L.) Michx., blue cohosh.

Perennial herb of woodlands in the Eastern and North Central States, grown in wild gardens and used pharmaceutically.

Botrytis sp. (*?B. streptothrix* (Cke. & Ell.) Sacc.), leaf blight. N.J., N.Y. Conidial stage of *Streptotinia* sp.
Calloria caulophylli (Ell. & Ev.) Rehm, on stems. N.Y.
Cercospora caulophylli Pk., leaf spot. Vt. to Va., Mo., and Wis.
Vermicularia hysteriiformis Pk., on stems. N.Y., Wis.

Mahonia

(1) *M. aquifolium* (Pursh) Nutt., Oregon-grape (hollygrape). Range 1,2,4,6,7,11,12, 13,14,15,16. Cultivated, zone 5.
(2) *M. nervosa* (Pursh) Nutt., Cascades mahonia. Range 1,2,4,12. Cultivated, zone 5.
(3) *M. pinnata* (Lag.) Fedde, cluster mahonia. Range 1,3,5. Cultivated, zone 7.
(4) *M. repens* (Lindl.) G. Don, creeping mahonia. Range 4,5,7,9,11,12,13,14,15,16.
(5) Other species.

Evergreen vines or small to medium shrubs of western North America; grown for ornament, especially (1), and useful in erosion control; several are minor honey plants and some bear fruit useful in making preserves, or furnish dyes and drugs; useful to wildlife.

Cercospora sp., leaf spot. La. (5).
Coccomyces coronatus (Schum. ex Fr.) de N., on old leaves. Oreg., Wash. (2); Calif. (3); Idaho (4).
Cucurbitaria berberidis Pers. ex S.F.Gray, on twigs and branches. Calif., Oreg. (1).
Cumminsiella sanguinea (Pk.) Arth. (O,I,II,III), rust. Calif., Oreg., Wash. (1); Calif., Idaho, Wash. (2); Calif. (3); S. Dak. to Ariz., Calif., and Wash. (4).
C. texana (Holw. & Long) Arth. (O,I,II,III)—Tex., on *M. trifoliolata*.
C. wootoniana Arth. (II,III)—Ariz., N. Mex. (on *M. fremontii* and *M. haematocarpa*).
Dothidella berberidis (Wahl.) Th. & Syd., on branches, ?canker. Oreg. (1).
?Gloeosporium berberidis Cke., leaf spot. Wash. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Laestadia berberidis Del., on leaves. Md. (1). Perhaps a synonym of *Mycosphaerella berberidis*.
Leptosphaeria berberidis Richon, canker, leaf blotch. Idaho, Md. (1). Also reported as *L. coniothyrium*

Sacc. f. *berberidis* (Richon) Cif.; perhaps distinct from either.
Meloidogyne sp., root rot nematodes. (1).
Mycosphaerella berberidis (Auers.) Lindau, on leaves. Wash. (2).
Phomopsis sp., leaf spot (?secondary). Wash. (2).
Phyllosticta spp., leaf spot. N.J. (1).
P. berberidis Rabh.—Wash. (4). Probably conidial stage of *Mycosphaerella berberidis*.
P. japonica Thuem.—Conn. (5).
P. mahoniana (Sacc.) Allesch.—Ala. (1).
P. mahoniicola Pass.—Ala. (1), Wash. (2).
Puccinia graminis Pers. (O,I), rust. Calif. (3); Mich., N. Dak. (5). II and III on cereals and grasses. These reports are of natural infection. In U.S. Dept. Agr. Tech. Bul. 300, experimental infection is reported on *M. aquifolium* (on berries and slightly on leaves), *M. fremontii*, and *M. nervosa* (O only); *M. repens* is immune.
P. koeleriae Arth. (O,I)—Idaho, Oreg., Wash. (1); S. Dak. to N. Mex. and Idaho (4). II and III on *Koeleria cristata*.
P. mirabilissima Pk.: See *Cumminsiella sanguinea*.
P. oxalidis (Lév.) Diet. & Ell. (O,I)—N. Mex., Tex. (4). II and III on *Oxalis* spp.
Pyrenochaeta berberidis (Sacc.) Brun., on branches. Calif. (1).
Uropyxis sanguinea Arth.: See *Cumminsiella sanguinea*.

Nandina

N. domestica Thunb.

Evergreen shrub of eastern Asia, cultivated for ornament, zone 7.

Cercospora nandinae Nagatomo, leaf spot. Ala., S.C.
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, Tex.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.,
Meloidogyne sp., root knot nematodes. N.C., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Chlorosis—physiological, attributed to alkaline soil. Tex.

Podophyllum

P. peltatum L., mayapple.

Perennial herb of woodlands in the Eastern and Central States and southward; often grown in wild gardens, source of drug podophyllum.

Botrytis cinerea Pers. ex Fr., gray mold. N.J.
Cercospora podophylli Tehon & Daniels, leaf spot. Ill.
Discohainesia oenotherae (Cke. & Ell.) Nannf., leaf spot. Va.
Gloeosporium podophyllinum: See *Septotinia podophyllina*.
Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf spot. Del., Tex.
Phyllosticta podophylli (Curt.) Wint., leaf spot. N.Y. to Ala., Ark., and Wis.
P. podophyllina Tehon & Stout—Ill.
Puccinia podophylli Schw. (O,I,III), rust. General.
Rhizoctonia sp., stem rot. Mo.
Septogloeum podophyllinum (Ell. & Ev.) Sacc.: See *Septotinia podophyllina*.
Septoria podophyllina Pk., leaf spot. N.Y. to Miss., Mo., and Wis.
Septotinia podophyllina Whet., leaf blight. Del., Md., Mo., N.J., N.Y., Va., W. Va.
Vermicularia podophylli Ell. & Dearn., leaf spot. Tex., Va.

Vancouveria

Vancouveria spp.

Woodland perennial herbs of the north Pacific coast; grown in wild gardens.

Phragmodothis berberidis (Alm. & Camara) Th. & Syd., leaf spot. Calif. On *V. parviflora* Greene.
Ramularia vancouveriae (Ell. & Ev.) Sprague, leaf spot. Calif., Oreg. On *V. hexandra* (Hook.) Morr. & Dcne.

BETULACEAE

Alnus, alder

I. Native Species, Eastern

(1) *Alnus crispa* (Ait.) Pursh, American green alder. Range 26,27. Also var. *mollis* Fern. Range 23,24.

(2) *A. incana* (L.) Moench, speckled alder. Range 21,22,23,24,26,27.

(3) *A. rugosa* (Du Roi) Spreng., hazel alder. Range 20,22,23,24,25,26,27,28,29.

Usually shrubs or small trees (1,3), sometimes larger trees (2); (2) grown for ornament, zone 2; useful to wildlife.

Cenangium furfuraceum (Roth ex Fr.) de N., on twigs. Maine, Mich., N.Y. (2,3).
Cercospora alni Chupp & H.C.Greene, leaf spot. Wis. (1).
Cryptospora femoralis (Pk.) Sacc., on twigs. Ga., N.J., N.Y., W. Va. (2,3). Also reported in the conidial stage as *?Cryptosporium neesii* Cda.
C. alnicola Hoehn. (*C. suffusa* (Fr.) Tul. var. *nuda* Pk., in part)—N.Y.
Cuscuta compacta Juss., dodder. Md., Va. (3).
Cylindrosporium vermiforme J.J.Davis, leaf spot. Wis. (1,2).
Daedalea confragosa Bolt. ex Fr., wood rot, ?trunk canker. Ind. (2).
D. unicolor Bull. ex Fr.—Maine, Va. (2,3).
Daldinia concentrica (Bolt. ex Fr.) Ces. & DeN., wood rot. Maine, Mich., N.H. (2,3).
Dothidella alni Pk., black leaf spot. N.Y. (1).
Erysiphe aggregata (Pk.) Farl., powdery mildew on fertile catkins. Maine to N.J. and Minn. (2); N.Y. to Ohio and Mich. (3).
Eutypella cerviculata (Fr.) Sacc., on trunks and branches. Maine to Ga. and Miss. (3).
E. glandulosa (Cke.) Ell. & Ev.—Ga., Tenn.
Exoascus: See *Taphrina*.
Fomes igniarius (L. ex Fr.) Kickx, heartwood rot. Vt. (2).
F. scutellatus (Schw.) Cke., wood rot. Maine to Ala. and Mich. (2,3).
Gibberidea alnea (Pk.) Wehm., on twigs. N.Y.
Gloeosporium alni Ell. & Ev., leaf spot. W. Va. (3).
G. alnicola Dearn. & House—N.Y. (3).
Gnomoniella tubiformis (Tode ex Fr.) Sacc., on folding leaves, ? leaf spot. N.C. (1); Pa. to Ga. and Wis. (2,3). The conidial stage, reported variously as *Gloeosporium cylindrospermum* (Bon.) Sacc., *Leptothyrium alneum* (Lév.) Sacc., and *?Septoria alnicola* Cke., develops on attached leaves.
Hydnoporia fuscescens (Schw.) Murr., wood rot. Va.
Hymenochaete agglutinans Ell., on trunks and branches, ?canker. Mich., N.Y., Pa., Va. (2,3).

Hypoxylon morsei Berk. & Curt., on trunks and branches, ?canker. Maine, N. Dak., N.Y. (2); *H. fuscum* Pers. ex Fr., and other species occur widely on dead branches.
Lenzites trabea Pers. ex Fr., wood rot. Cosmopolitan.
Mamiania alni J.H.Miller & G.E.Thompson, on fallen leaves. Ga. (3).
Melanconis alni Tul. var. *marginalis* (Pk.) Sacc., on branches, ? canker, dieback. Maine to N.J. and Wis. (*). Also reported in the conidial stage as *?Melanconium sphaeroideum* Lk.
M. thelebola (Fr.) Sacc.—Ga., N.Y., Pa. (2,3). Also reported in the conidial stage as *Naemospora alni* Allesch.
Microsphaera alni DC. ex Wint., powdery mildew. Maine to Ala., Tex., and Wis. (2,3).
Mycosphaerella alnicola (Pk.) House, on fallen leaves. N.Y. (1).
M. perparva (Sacc.) House—N.Y. (2).
Nectria coccinea Pers. ex Fr., on branches, ?canker. N.Y., Pa. (2).
N. galligena Bres., trunk canker. N.H. (2).
?Ophiodothis alnea (Pers. ex Fr.) Ell. & Ev., tar spot. N.H. (1), Pa. (2).
Pezicula alni Rehm, on dead branches. Mich., Minn., N.C. (2,3).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Maine to N.J. and Wis. (2); Ala., Ohio, S.C. (3).
Physalospora abdita (Berk. & Curt.) N.E.Stevens, on branches. N.C. (3).
P. obtusa (Schw.) Cke.—S.C., Va. (3).
Polyporus spp., wood rot of dead trunks and branches; distribution cosmopolitan: *P. adustus* Willd. ex Fr., *P. albellus* Pk., *P. dichrous* Fr., *P. hirsutus* Wulf. ex Fr., *P. pargamenus* Fr., *P. pubescens* Schum. ex Fr., *P. radiatus* Sow. ex Fr., *P. tulipiferus* (Schw.) Overh., *P. versicolor* L. ex Fr.
Poria spp., wood rot of dead trunks and branches; distribution cosmopolitan: *P. ferrea* Pers. ex Bourd. & Galz., *P. ferruginosa* (Schrad. ex Fr.) Karst., *P. obliqua* (Pers. ex Fr.) Bres., *P. punctata* (Fr.) Cke., *P. versipora* Pers. ex Romell.
Rhabdospora maculans Sacc. & Berl., on twigs. S.C. (3).
Scorias spongiosa (Schw.) Fr., sooty mold on leaves and twigs following aphid or scale infestation. N.Y. to N.C. and W. Va. (2).
Septobasidium filiforme Couch, brown felt. N.C. (3). *S. peckii* Couch—N.Y. (2).
Septoria alni Sacc. (*S. alnifolia* Ell. & Ev.), leaf spot. N.Y., Wis. (1,2,3).
Solenia ochracea Hoffm. ex Fr., on bark of dead or sometimes living branches and trunks. Cosmopolitan.
Sphaeropsis alni Cke. & Ell., on twigs, ?dieback. S.C. (3). *S. alnicola* Pk.—N.Y. (2). SEE ALSO *Physalospora* of which these are probably the conidial stage.
Steccherinum ochraceum (Pers. ex Fr.) S.F.Gray, wood rot. Maine, Mich., N.Y. (2,3).
Stereum spp., wood rot usually of dead trunks and branches: *S. albobadium* (Schw.) Fr., *S. fasciatum* Schw., *S. gausapatum* Fr., S. *hirsutum* Willd. ex Fr., *S. purpureum* Pers. ex Fr.
Taphrina robinsoniana Gies. (*T. rugosa* Ray), hypertrophy of mature fertile catkins. Maine to Ga., Tex., and Minn. (2); Mass. to Ala. and Ark. (3).
T. tosquinetii (West.) Tul. (*T. media* Palm), witches'-broom. N.H. (1).
Tympanis alnea Pers. ex Fr., on dead branches. N.Y., Pa. (2).
ROOT TUBERCLES (GALLS)—formerly ascribed to *Plasmodiophora alni* (Wor.) Moeller, but not accepted by authorities as belonging to that genus; to *Frankiella alni* (Wor.) Maire & Tison (?Actinomycetales), a name preempted for a fungus; and to *Actinomyces alni* Peklo; but the identity of the causal organism is still uncertain. Cosmopolitan.

II. Native Species, Western

(1) *Alnus oblongifolia* Torr., New Mexican alder. Range 11,14.
(2) *A. rhombifolia* Nutt., Sierra alder. Range 1,3,4,5,6,7,8.
(3) *A. rubra* Bong., red alder. Range 1,2,5,6.
(4) *A. sinuata* (Regel) Rydb., Sitka alder. Range 2,4,6,7,12.
(5) *A. tenuifolia* Nutt., thinleaf alder, mountain alder. Range 4,7,11,12,13,14.

These species may form large trees, especially (2) and (3); (3) used commercially; all furnish food for wildlife.

Armillaria mellea Vahl ex Fr., root rot. Calif. (2).
Botrytis cinerea Pers. ex Fr., gray mold (leaves). Wash. (3).
Cenangium furfuraceum (Roth) de N., on twigs. Wash. (3); Idaho, Mont. (5); Calif. (2).
Cercosporella alni Dearn. & Barth., leaf spot. Oreg., Wash. (3); Alaska (4).
Ciboria alni (O.Rostr.) Buchw., on overwintered seeds; *C. amentacea* (Balbis) Fckl., on fallen catkins; *C. rufescens* Kanouse, on dead leaves. Oreg. (3).
Coniophora puteana (Schum. ex Fr.) Karst., wood rot. Idaho (5).
Cryptospora suffusa (Fr.) Tul., on twigs. Calif. (3), Colo. (5).
Cylindrosporium alni Dearn. & Barth., leaf spot. Alaska (3); Mont. (5).
Cytospora umbrina (Bon.) Sacc.: SEE *Melanconis thelebola.*
Daedalea unicolor Bull. ex Fr., wood rot. Wash. (3); Idaho, Mont. (5).
Daldinia occidentalis Child, wood rot. Idaho, Mont., Wash. (2,5).
D. vernicosa (Schw.) Ces. & de N.—Idaho, Mont., Wash. (5).
Didymosphaeria oregonensis Goodding, trunk and branch canker. Idaho, Oreg., Wash. (3,4,5).
D. nana Rostr. var. *brachyspora* Sacc., on leaves. Alaska (4).
Diplodia sarmentorum Fr., on twigs. Wash. (3).
Erysiphe aggregata (Pk.) Farl., powdery mildew of fertile catkins. Calif., Wash. (2).
Eutypella cerviculata (Fr.) Sacc., on bark of dead branches and trunks. General (3,4,5).
E. alnifraga (Wahl.) Sacc.—Wash. (3), Colo. (5).
Flammula alnicola Fr., butt rot. Oreg. (3), Idaho (5).
Fomes spp., butt and trunk rot, heartwood rot: *F. applanatus* (Pers. ex Wallr.) Gill.—Wash. (3); *F. fomentarius* (L. ex Fr.) Kickx—Oreg., Wash. (3); *F. igniarius* (L. ex Fr.) Kickx—Idaho, Mont. (2,5); Oreg. (3); Tex. (5); *F. pini* (Sw. ex Fr.) Cke.—Oreg. (3); Idaho, Mont. (5).
Gibberidea alnea (Pk.) Wehm., on branches. Alaska (4).
Gnomonia alni Plowr., leaf spot. Calif. (2,3), Oreg. (3), Tex. (5). *G. perversa* Rehm (*?Hypospila californica*), on leaves. Oreg., Wash. (3).
Gnomoniella tubiformis (Tode ex Fr.) Sacc., on fading or fallen leaves. Oreg. (3); Alaska (4); Colo., Oreg. (5).
Hydnoporia fuscescens (Schw.) Murr., wood rot. Wash. (3).
Hymenochaete agglutinans Ell., wood rot, trunk canker. Idaho (5). Other species frequent on dead wood.
Hypospila californica Dearn. & Barth., leaf spot. Calif. (2,3).

Hypoxylon spp., as *H. fuscum* Pers. ex Fr., *H. multiforme* Fr., and others; commonly on dead branches and trunks. *H. morsei* Berk. & Curt.—Colo. (5), is reputed at times to attack living trees.
Lenzites sepiaria Wulf. ex Fr., wood rot. Idaho, Wash. (5).
Melampsoridium alni (Thuem.) Diet. (II,III), rust. Calif. (2,3), Tex. (?5). O and I on *Larix* in Europe.
Melanconis alni Tul. var. *marginalis* (Pk.) Wehm., on branches. Calif., Oreg. (3); Idaho, Alaska (4); Colo. (5). *M. thelebola* (Fr.) Sacc.—Calif., Wash. (3); Mont. (5).
Melanconium candidum (Pk.) Zeller, on branches. Oreg., Wash. (3).
Microsphaera alni DC. ex Wint., powdery mildew. Oreg., Wash. (3); Mont., Alaska (4); Tex., Utah (5).
Mycosphaerella sp. (*Sphaerella alni-viridis* de N.), on leaves. Alaska (4). (*S. conglomerata* (Wallr.) Auers.)—Calif.
Nectria cinnabarina Tode ex Fr., on twigs, ?canker. Wash. (2), Alaska (4).
?N. galligena Bres.—Oreg. (3).
N. pithoides Ell. & Ev.—Wash. (3).
Phialea seminicola Kienholz & Cash: SEE *Ciboria alni.*
Pholiota adiposa Fr., butt rot, wound rot. Idaho, Wash. (5).
P. aurivelloides Overh., on dead wood. Colo., N. Mex., Wyo. (5).
Phoradendron flavescens (Pursh) Nutt. var. *macrophyllum* Engelm., mistletoe. Ariz., N. Mex. (1).
P. villosum Nutt.—Calif. (2).
Phyllosticta alnea Oud., leaf spot. Alaska (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3,5).
Pleurotus serotinus Schrad. ex Fr., sapwood rot. Idaho (5).
Polyporus spp., wood rot, usually of dead trunks and branches; distribution cosmopolitan: *P. adustus* Willd. ex Fr., *P. dichrous* Fr., *P. gilvus* (Schw.) Fr., *P. hirsutus* Wulf. ex Fr., *P. pubescens* Schum. ex Fr., *P. tulipiferus* (Schw.) Overh.
Poria spp., wood rot, usually of dead trunks and branches: distribution cosmopolitan: *P. ferrea* Pers. ex Bourd. & Galz., *P. ferruginosa* (Schrad. ex Fr.) Karst., *P. punctata* (Fr.) Cke., *P. subacida* (Pk.) Sacc., *P. versipora* Pers. ex Rom.
Schizophyllum commune Fr., wood rot. Wash. (2).
Septogloeum variegatum Ell. (in herb.), leaf spot. Calif. (3).
Septoria alnifolia Ell. & Ev. (=*S. alni* Sacc.?), leaf spot. Calif. (2,3); Oreg., Wash. (3); Alaska (4).
Steccherinum ochraceum (Pers. ex Fr.) S.F.Gray, wood rot. Wash. (3).
Stereum spp., decay of dead and fallen wood: *S. fasciatum* Schw., *S. fuscum* (Schrad. ex Fr.) Quél., *S. hirsutum* Willd ex Fr., *S. purpureum* Pers. ex Fr. Cosmopolitan.
Taphrina amentorum (Sadeb.) Rostr., hypertrophy of fertile catkins. Alaska (3); also reported but not confirmed in the Pacific Northwest, the examined specimens belonging to the following:
T. japonica Kusano (*T. macrophylla* Ray), leaf curl. Calif., Oreg., Alaska (3).
T. occidentalis Ray—Calif. (2,3,5); Oreg. (2,3,4,5); Idaho, Mont., Wash. (5).
Tympanis alnea Pers. ex Fr., on dead branches. Calif., Mont. (5).
Valsa ceratophora Tul., on dead branches. Cosmopolitan.

ROOT TUBERCLES. See section I.

III. Cultivated Species, Introduced

(1) *Alnus japonica* (Thunb.) Steud., Japanese alder. Zone 5.
(2) *A. glutinosa* (L.) Gaertn., black alder. Zone 3; also locally naturalized in the Northeastern States.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Polyporus versicolor L. ex Fr., sapwood rot. Va. (2).
Septoria alni Sacc., leaf spot. Wis. (2).
Sphaeropsis alnicola Pk., on twigs. N.Y. (2).

Betula, birch

I. Yellow Birch Group

(1) *Betula lenta* L., sweet birch. Range 22,24, 25,26,27,28,29.
(2) *B. lutea* Michx. f., yellow birch. Range 21,22,23,24,25,26,27,28.
(3) *B. nigra* L., river birch. Range 20,22,23, 25,26.27,28,29.

Large forest trees, wood used commercially; useful to wildlife.

Aleurodiscus oakesii (Berk. & Curt.) Cke., bark patch. Vt. (2).
Armillaria mellea Vahl ex Fr., root rot. Northeastern States (2).
Chlorociboria aeruginosa (Oed. ex Fr.) Seaver (*Chlorosplenium aeruginosum* de N.), green stain of sapwood. Cosmopolitan.
Ciboria betulae (Wor.) White, on fallen aments. Md. (3).
Cladosporium caducum J.J.Davis, leaf mold. Wis. (3).
Comandra umbellata (L.) Nutt., seed plant parasitic on roots. Occasional in Northeastern States (1,2).
Coniophora puteana (Schum. ex Fr.) Karst., wood rot. Cosmopolitan.
Cryptospora betulae Tul., on dead branches. N.J., N.Y. (1).
C. humeralis Dearn. & House.—N.Y. (1).
C. tomentella (Pk.) Berl. & Vogl.—Ga. (3).
Cytospora: SEE *Valsa*, in Section II.
Daedalea spp., wood rot, on dead or sometimes living trunks: *D. confragosa* Bolt. ex Fr.—Maine to N.C., Tenn., and Wis. (*); *D. quercina* L. ex Fr.—Conn. (?); *D. unicolor* Bull. ex Fr.—Northeastern States (2).
Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., wood rot on stumps and logs. Cosmopolitan. *D. vernicosa* (Schw.) Ces. & de N.—N.Y.
Dermea molliuscula (Schw.) Cash, on dead twigs. N.H. to Va. and Mich. (1,2).
Diatrypella betulina (Pk.) Sacc., on dead branches. N.Y., Wis. (1,2). *D. discoidea* Cke. & Pk.—Ga., Miss., N.Y., W. Va. (1,2). *D. favacea* (Fr.) Nits. —Pa. (2); Ga., Ky. (3).
Discohainesia oenotherae (Cke. & Ell.) Nannf., on leaves. N.C. (3).
Fomes spp., wood rot, including butt and heart rot of living trees and sapwood rot of dead trunks and logs; distribution general except as otherwise stated: *F. applanatus* (Pers. ex Wallr.) Gill., white-mottled heart rot; *F. connatus* (Weinn. ex Fr.) Gill., white spongy heart rot, chiefly (1) and (2) in the Northeastern States; *F. everhartii* Ell. & Gall., yellowish flaky heart rot, N.J., Wis. (2); *F. fomentarius* (L. ex Fr.) Kickx, yellowish sapwood rot; *F. igniarius* (L. ex Fr.) Kickx, white

spongy heart rot—its resupinate form, var. *laevigata* (Fr.) Overh., also known as *Poria laevigata* (Fr.) Cke., causes trunk cankers and heart rot especially on (2) in the Northeast; *F. pinicola* (Sw. ex Fr.) Cke., brown crumbly heart rot, N.H., Vt., Wis. (1,2); *F. robustus* Karst., white sapwood and heart rot, Pa. (1,3); Iowa, Md., Va., Wis. (3).

Ganoderma lucidum (Leyss. ex Fr.) Karst., white spongy rot. N.Y. (2).

Gloeosporium betulae-luteae Sacc. & Dearn., leaf spot. N.Y. (2). *G. betularum* Ell. & Martin—Ill., N.J., Pa., Tex. (1); Mass. to Fla., Tex., and Wis. (3).

Gnomonia setacea (Pers. ex Fr.) Ces. & de N., on fallen leaves. N.Y. (2); Ga. (3).

Hydnoporia fuscescens (Schw.) Murr., wood rot. Va. (2).

Hymenochaete agglutinans Ell., trunk canker. Mich., Pa., Va. (1,2).

Hypoxylon pruinatum (Klotzsch) Cke., trunk canker, sapwood rot. Mich., Minn. (2). Various other species reported on dead wood.

Lenzites betulina L. ex Fr., white sapwood rot of dead trunks and logs. Cosmopolitan.

Melampsoridium betulinum (Pers.) Kleb. (II,III), rust. Ind., Maine, N.H., Vt. (2). O and I on *Larix laricina*.

Melanconis spp., on twigs and branches, ?canker, dieback. *M. acrocystis* (Pk.) Ell. & Ev.—Mich., N.J., N.Y., Vt. (1,2); *M. decorahensis* Ell.—Iowa, Mass. (2), Ga. (3); *M. nigrospora* (Pk.) Wehm.—N.Y. (2); *M. stilbostoma* (Fr.) Tul.—Miss. (1), N.Y., Vt., W. Va. (2); also reported in the spermatial stage, *Libertella betulina* Desm., and the pycnidial stage, *Melanconium bicolor* Nees.

Microsphaera alni DC. ex Wint., powdery mildew. N.H., Pa. (1); Mass. (2).

Nectria cinnabarina Tode ex Fr., on twigs, ?dieback. Maine to Ga. and Mich. (*).

N. coccinea Pers. ex Fr., on branches, ?canker. Conn., Mass., Mich., N.Y. (1,2).

N. galligena Bres., trunk canker. Conn., N.Y., Pa. (*).

N. mammoidea Phill. & Plowr., on dead branches. Vt. (2).

Panus strigosus Berk. & Curt., wound rot. Mich. (2).

Pholiota squarrosoides Pk., wood rot. Mich. (2).

Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla. Ind., Tex. (3).

Phyllactinia corylea Pers. ex Karst., powdery mildew. Mass., N.Y., Va. (1); Vt. (2); Ill., Mo., Tex., Wis. (3).

Phyllosticta betulina Sacc., leaf spot. Okla. (3).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).

Physalospora obtusa (Schw.) Cke., on dead branches. Ga. (3).

Phytophthora cactorum (Leb. & Cohn) Schroet., bleeding canker. N.J. (2).

Pleurotus serotinus Schrad. ex Fr., wound rot. Wis. (2).

Polyporus spp., wood rot, chiefly of dead trunks and logs, sometimes heart rot of living trees: cosmopolitan: *P. adustus* Willd. ex Fr.; *P. albellus* Pk.; *P. betulinus* Bull. ex. Fr., powdery brown rot; *P. caesius* Schrad. ex Fr.; *P. cinnabarinus* Jacq. ex Fr., white sapwood rot; *P. gilvus* (Schw.) Fr.; *P. hirsutus* Wulf. ex Fr.; *P. hispidus* Bull. ex Fr., white spongy heart rot; *P. radiatus* (Sow.) ex Fr.; *P. resinosus* Schrad. ex Fr.; *P. spraguei* Berk. & Curt.; *P. tulipiferus* (Schw.) Overh.; *P. versicolor* L. ex Fr.

Poria spp., wood rot, chiefly of dead trunks and logs, sometimes heart rot of living trees: *P. leavigata* (Fr.) Cke., and *P. obliqua* (Pers. ex Fr.) Bres., white spongy rot, trunk canker—Northeastern and Great Lakes States (1,2); *P. subacida* (Pk.) Sacc. —Vt. (2); *P. unita* Pers. ex Cke.—cosmopolitan; *P. versipora*—Pers. ex Romell—Great Lakes States (2).

Schizophyllum commune Fr., sapwood rot. Cosmopolitan.

Scleroderris seriata (Fr.) Rehm, on dead branches. N.J., N.Y., Pa. (2).

Septoria betulicola Pk., leaf spot. Vt. (1), N.Y. (2). *S. microsperma* Pk.—N.Y., Pa., W. Va. (1). This has been referred to *Sacidium* and *Cylindrosporella*, both questionable genera.

Solenia ochracea Hoffm. ex Fr., bark patch. Cosmopolitan.

Sphaerognomonia carpinea (Fr.) Poteb., on fallen leaves. Ga. (3).

Sphaeropsis betulae Cke., on twigs. N.Y. (2).

Steccherinum ochraceum (Pers. ex Fr.) S.F.Gray, white spongy sapwood rot. N.Y., Va., W. Va. (2).

S. pulcherrimum (Berk. & Curt.) L.W.Miller — Ind. (3).

Steganosporium piriforme (Hoffm. ex Fr.) Cda., on twigs. Vt. (1).

Stereum spp., wood rot, chiefly of dead branches and trunks, sometimes heart rot of living trees; distribution cosmopolitan except as noted: *S. fasciatum* Schw.; *S. hirsutum* Willd. ex Fr.; *S. lobatum* (G.Kunze) Fr.; *S. murrayi* (Berk. & Curt.) Burt, heart rot, trunk canker — Maine to Tenn. and Minn. (*); *S. purpureum* Pers. ex Fr.—Vt. (2); *S. sericeum* Schw.—Md., N.C. (3); *S. versiforme* Berk. & Curt.

Taphrina sp., leaf blister. Mass., N.H. (? 1); Maine (2).

T. americana Mix, witches'-broom. N.H., ?Vt. (2).

T. carnea Johans., leaf curl. Maine (2); N.H.

Torula ligniperda (Willd.) Sacc., red stain of heartwood. Northeastern States (1).

DIEBACK—cause unknown, perhaps virus. Maine (2).

II. White Birch Group

(1) *Betula papyrifera* Marsh., paper birch, canoe birch. Range 12,13,15,18,21,22,23, 24,26,27.

(2) *B. papyrifera* Marsh. var. *occidentalis* (Hook.) Sarg., western paper birch. Range 1,2,12.

(3) *B. pendula* Roth, European white birch.

(4) *B. populifolia* Marsh., gray birch. Range 24,26,27,28.

Small to medium, native (1,2,4) or introduced (3) trees; wood used commercially, especially (1); cultivated for ornament, zone 2, especially (1) and (3); useful to wildlife.

Armillaria mellea Vahl ex Fr., root rot. Reported from Minn. (1); but perhaps general.

Boletus scaber Fr. var. *fusca* Pk., mycorhiza. Mich. (1).

Corticium galactinum (Fr.) Burt, on dead wood. N.H. (1,4).

Cortinarius sp., mycorhiza. Mich. (1).

Cryptospora betulae Tul., on dead branches. Mass. (1).

C. tomentella (Pk.) Berl. & Vogl.—N.Y. (4).

Cylindrosporium betulae J.J.Davis, leaf spot. Del., N.Y., Wis. (1).

Cytospora spp.: SEE *Valsa*.

Daedalea spp., wood rot, usually of dead trunks, sometimes heart rot of living trees: *D. confragosa* Bolt. ex Fr.—Mich., Vt. (1); *D. unicolor* Bull. ex Fr.—Northeastern and Great Lakes States (1); Mont., Idaho, Wash. (2); Maine (4).

Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., wood rot. Maine, Vt. (1); Conn. (4).
D. occidentalis Child—Idaho, Wash. (2).
Diatrype stigma Hoffm. ex Fr., on dead branches. Maine, Mass., Vt. (1); Idaho (2).
Diatrypella betulina (Pk.) Sacc., on dead branches. Maine, Mich., Minn., N.Y. (1); Idaho (2); Maine (4).
D. discoidea Cke. & Pk. and *D. favacea* (Fr.) Nits.—N.Y. (4).
Discosia artocreas Tode ex Fr., on fallen leaves. Maine (4).
Eutypella angulosa (Nits.) Sacc., on dead branches. Mont. (2), N.Y. (4).
E. cerviculata (Fr.) Sacc.—S. Dak. (1).
Fomes spp., various wood rots, sometimes of living trees: *F. applanatus* (Pers. ex Wallr.) Gill., white butt rot—Maine to Minn. (1); Mont. (2); N.Y. (4); *F. conchatus* (Pers. ex Fr.) Gill.—Idaho, Mont. (2); *F. connatus* (Weinm. ex Fr.) Gill.—Maine (4); *F. everhartii* Ell. & Gall., white heart rot—Minn., Wis. (1); *F. fomentarius* (L. ex Fr.) Kickx, yellowish sapwood rot—Maine to S. Dak. (1); Mont. to Alaska and Wash. (2); Maine (4); *F. igniarius* (L. ex Fr.) Kickx, white heart rot—Maine to Minn. (1); Idaho, Mont., Wash. (2); Maine (4); *F. pini* (Brot. ex Fr.) Karst.—Idaho (2); *F. pinicola* (Sw. ex Fr.) Cke.—Vt., Wis. (1); Idaho. Mont. (2); N.Y. (4); *F. robustus* Karst.—Wis. (1); *F. subroseus* (Weir) Overh.—Mont. (2).
Gloeosporium betulae-papyriferae Dearn. & Overh., leaf spot. N.Y., Pa. (1).
G. betularum Ell. & Martin—Colo., Wis. (1).
G. betulicola Sacc. & Dearn.—N.Y. (4).
Gnomonia campylostyla Auers., on fallen leaves. Colo. (2).
G. setacea (Pers. ex Fr.) Ces. & DeN.—Md. (3).
Hypoxylon multiforme Fr. (*H. granulosum* Bull. ex Fr.), on dead wood. Maine to Minn. (1); Idaho, Wash., Alaska (2).
Lenzites betulina L. ex Fr., brown cubical rot of dead trunks and timber. Reported in Minn. (1); Idaho, Mont. (2); but probably general.
L. saepiaria Wulf. ex Fr.—Idaho, Wash. (2).
L. trabea Pers. ex Fr.—Mont. (2).
Melampsoridium betulinum (Pers.) Kleb. (II,III), rust. Conn., Ill., Maine, Mich., Minn., N.H.: Idaho, Mont., Wash. (2); Northeastern States (4). O and I on *Larix*.
Melanconis decorahensis Ell., on dead branches. Mass. (1,3); N.Y., Pa. (4).
M. nigrospora (Pk.) Wehm.—Mich. (1).
M. stilbostoma (Fr.) Tul.—Mass. to Iowa and Wis. (1,3); Maine, N.Y. (4).
Merulius tremellosus Schrad. ex Fr., wood rot: Mass., Mich., Minn., Vt. (1); Idaho, Mont. (2).
Nectria cinnabarina Tode ex Fr., on dead branches. Minn. (1); Colo. (2).
N. coccinea Pers. ex Fr.—N.Y. (1,4).
N. galligena Bres., trunk and branch canker. Maine to Pa. and Mich. (1); Pa. (3); Conn., Mass., N.H., N.Y. (4).
Phyllactinia corylea Pers. ex Karst, powdery mildew. Ill., Iowa, Vt., Wis. (1); Mont., Wyo. (2); N.Y. (4).
Phyllosticta betulina Sacc., leaf spot. N.Y. (3).
Phytophthora cinnamomi Rands, root rot of seedlings. Md. (1,3).
Pleomassaria siparia (Berk. & Br.) Sacc. (*Prosthemium betulinum* Kunze ex Fr.), on twigs. Mass. (3).
Polyporus spp., various wood rots, usually of dead trunks and logs; cosmopolitan distribution: *P. adustus* Willd. ex Fr.; *P. albellus* Pk.; *P. betulinus* Bull. ex Fr., powdery brown rot; *P. biennis* Bull. ex Fr. var *distortus* (Schw.) Graff—Ind. (1); *P. Cinnabarinus* Jacq. ex Fr., white sapwood rot; *P. dichrous* Fr.—Mich. (1), Mont. (2); *P. elegans* Bull. ex Fr.; *?P. glomeratus* Pk.—Mich. (1), Mont. (2); *P. hirsutus* Wulf. ex Fr.; *P. pargamenus* Fr.; *P. pubescens* Schum. ex Fr.; *P. resinosus* Schrad. ex Fr.—Mich., Minn. (1); *P. sanguineus* L. ex Fr.; *P. stereoides* Fr. ex Rom.—Mont., Wash., Alaska (2); *P. tulipiferus* (Schw.) Overh.; *P. versicolor* L. ex Fr.
Poria spp., various wood rots: *P. ferrea* (Pers.) Bourd. & Galz., Mont. (2); *P. ferruginosa* Schrad. ex Fr.—Maine, Pa. (1,4); Wash. (2); *P. laevigata* (Fr.) Cke.—Maine, N.Y., Pa. (1,4); Wash. (2); *P. obliqua* (Pers. ex Fr.) Bres., trunk canker, white spongy rot—Maine to Pa. and Mich. (1); Wash. (2); Mass., N.H., Pa., Vt. (4); *P. punctata* (Fr.) Cke.—Mont. (2); *P. subacida* (Pk.) Sacc.—N.Y. (1).
Pseudovalsa lanciformis (Fr.) Ces. & de N., on twigs. Ill. (1); Mass., N.Y. (3).
Septoria betulae (Lib.) West., leaf spot. Wis. (1).
S. betulicola Pk.—Oreg., Wash. (2); Wis. (3); Vt. (4).
S. betulina Pass.—Iowa (3).
S. microspermum Pk.—Wis. (1). SEE note in section I.
Sphaeropsis betulae Cke., on twigs. N.Y. (4). Var. *foliicola* J.J.Davis, on leaves. Wis. (1).
S. alnicola Pk.—N.Y. (3).
Steccherinum ochraceum (Pers. ex Fr.) S.F.Gray, white spongy rot. Iowa, Mich., N.J., Wis. (1).
Stereum spp., various wood rots, usually on dead trunks and branches: *S. fasciatum* Schw.—S. Dak. (1); Idaho, Mont., Wash. (2); *S. hirsutum* Willd. ex Fr.—Vt. (1); *S. murrayi* (Berk. & Curt.) Burt—Maine, N.Y., Pa. (1); Idaho, Oreg. (2); *S. ochraceo-flavum* Schw.—Maine (4); *S. purpureum* Pers. ex Fr.—Maine, Mich. (1); Idaho, Mont., Wash.
Taphrina americana Mix, witches'-broom. N.H., Vt., Wis. (1).
T. carnea Johans., red leaf blister, curl. N.H. (1).
T. flava Farl., yellow leaf blister. N.H., Wis. (1); Maine, Mass., N.H. (4).
Torula ligniperda (Willk.) Sacc., red stain of heartwood. Northeastern States (1).
Trametes mollis (Sommerf.) Fr., wood rot. Idaho, Mont. (2). SEE ALSO *Polyporus stereoides*.
Valsa spp., on dead twigs, ?canker and dieback: *V. betulina* Nits.—Mass., N.Y. (4); *V. sordida* Nits.—Mont. (2); *V. truncata* Cke. & Pk.—N.Y. (1).
Venturia ditricha (Fr.) Karst. (*Fusicladium betulae* Aderh.), on fallen leaves. Maine, N.Y. (4).

III. Miscellaneous Species

(1) *Betula fontinalis* Sarg., water birch, red birch. Range 4,7,8,9,12,13,14,15.
(2) *B. glandulosa* Michx., bog birch. Range 2,4,12,13,15,23.
(3) *B. neoalaskana* Sarg., Alaska birch. Alaska.
(4) *B. pumila* L., swamp birch. Range 18,21, 22,23,24,26,27.
(5) Other species.

Small trees (1) or shrubs (2,3,4); furnish browse for livestock and wildlife.

Cylindrosporium betulae J.J.Davis, leaf spot. Wis. (4).
Cytospora pulcherrima Dearn. & Hansbr., on twigs. Wash. (1).
Daedalea confragosa Bolt. ex Fr., wood rot. Wash. (1).
D. unicolor Bull. ex Fr.—Idaho (2), Alaska (3).
Daldinia occidentalis Child, wood rot. Mont. (2).

Euryachora betulina (Fr.) Schroet., black-speckled leaf spot. Idaho, N. Mex. (1); Maine (2); Wis. (4).
Fomes fomentarius (L. ex Fr.) Kickx, sapwood rot. Wash. (1); Alaska (3).
F. igniarius (L. ex Fr.) Kickx, heart rot. Alaska (3).
F. pinicola (Sw. ex Fr.) Cke.—Wash. (1).
Melampsoridium betulinum (Pers.) Kleb. (II,III), rust. Idaho, Mont., Wash. (2); Alaska (3,5); Mass., Mich., Minn., Wis. (4); Calif. (5).
Melanconis stilbostoma (Fr.) Tul., on dead branches. Alaska (3).
Microsphaera alni DC. ex Wint., powdery mildew, Mich., Wis. (4).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Wash. (1).
Polyporus spp., various wood rots; distribution cosmopolitan: *P. albellus* Pk.—Alaska (3); *P. cinnabarinus* Jacq. ex Fr.; *P. pargamenus* Fr.; *P. radiatus* Sow. ex Fr.—Alaska (5); *P. resinosus* Schrad. ex Fr.; *P. stereoides* Fr. ex Rom.—Alaska (5); *P. versicolor* L. ex Fr.
Scleroderris seriata (Fr.) Rehm, on dead branches. Colo. (1).
Septoria betulae (Lib.) West., leaf spot. Wis. (4).
S. betulicola Pk.—Wis. (5).
S. boycei Dearn.—Oreg. (1).
Stereum fasciatum Schw., wood rot. Mont. (1).
S. lobatum (G. Kunze) Fr.—N. Mex. (1).
Taphrina americana Mix, witches'-broom. Colo. (1).
T. bacteriosperma Johans., leaf yellowing, leaf deformity. N.H. (2), Alaska (5).
T. carnea Johans., red leaf blister, leaf curl. N.H., N.Y. (2).

Carpinus, hornbeam

(1) *C. caroliniana* Walt., American hornbeam. Range 20,21,22,23,24,25,26.27,28,29,30: also cultivated, zone 2.
(2) *C. betulus* L., European hornbeam. Cultivated, zone 5.

Small to medium-sized trees: grown for shade and hedges, chiefly (2): wood sometimes used commercially (1); useful to wildlife.

Aleurodiscus oakesii (Berk. & Curt.) Cke., bark patch. N.Y. (1).
Armillaria mellea Vahl ex Fr., root rot. Fla. (1).
Cercoseptoria caryigena (Ell. & Ev.) J.J.Davis, leaf spot. Wis. (1).
Clasterosporium cornigerum Ell. & Ev., leaf spot. Md., N.Y., ?Wis. (1). Perhaps this also reported as *C. pulchrum* Ell. & Ev. and *Cladosporium effusum* (Wint.) Demaree var. *carpineum* Ell. & Ev., an invalid name.
Cryptosphaerella callista (Berk. & Curt.) Fitz., on dead branches. Tex. (1).
Cylindrosporium dearnessii Ell. & Ev. (*Phleospora dearnessii* (Ell. & Ev.) Hoehn., leaf spot. Mich. (1).
Daedalea confragosa Bolt. ex Fr., wood rot. N.C. (1).
Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., wood rot. Md. (1). *D. loculata* (Lév.) Sacc.—Minn. (1).
Depazea carpinea (Schw.) Sacc., on dead leaves. N.C. (1).
Diaporthe bakeri Wehm., on dead branches. Ga., N.Y., Wis. (1). SEE ALSO *Melanconis chrysostroma*.
Diatrypella discoidea Cke. & Pk., on dead branches. Ga., N.Y. (1).
Eutypella cerviculata (Fr.) Sacc., on dead branches. Mich., Miss., N.Y. (1).
E. microcarpa Ell. & Ev.—Ga. (1).
Fomes igniarius (L. ex Fr.) Kickx, white spongy heart rot. Vt. (1).
Fusicladium effusum Wint. var. *carpineum* Ell. & Ev., leaf spot, mold. Wis. (1). SEE ALSO *Clasterosporium cornigerum*.
Gibberella baccata (Wallr.) Sacc., on twigs, ?dieback. Ala. (1).
Gloeosporium robergei Desm.: SEE *Sphaerognomonia carpinea*.
Gnomoniella fimbriella (Pers. ex Fr.) Sacc., on leaves. Mich., N.Y., Vt., Wis., W. Va. (1).
Helminthosporium tiara Berk. & Curt. SEE *Clasterosporium cornigerum*.
Hypoxylon spp., on dead wood: *H. rubiginosum* Pers. ex Fr.—cosmopolitan; *H. fuscum* Pers. ex Fr.—Mo.; *H. morsei* Berk. & Curt.—Iowa; *H. tinctor* (Berk.) Cke.—Ga.
Melanconis chrysostroma (Fr.) Tul. var. *ellisii* (Rehm) Wehm., on dead branches, ?canker. Ga., Iowa, Md., Mich., N.Y., Pa., S.C., Va. (1); Md., N.Y. (2).
M. platystroma Wehm.—Mich. (1).
Melogramma patens Morg., on dead branches. Ind., Ohio (1). *M. vagans* de N.—Ga. (1).
Microsphaera alni DC. ex Wint., powdery mildew. Ind., Iowa, Mass., Mich., Tex., Wis. (1).
Myxosporium carpini Pk., on twigs. N.Y., R.I. (1).
Nectria galligena Bres., trunk canker. Conn., N.Y. (1).
Pezicula carpinea (Pers. ex Fr.) Tul., branch and trunk canker. Mass. to Ga. and Okla. (1).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Ala., Ind., Ohio, Tex., Wis. (1).
Phyllosticta sp., leaf spot. Okla.
P. hesperidearum (Catt.) Penz.—Colo.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora obtusa (Schw.) Cke., on dead branches.
Pleomassaria carpini (Fckl.) Sacc., on branches. Ga. (1).
Polyporus spp., various wood rots; distribution as noted or general: *P. adustus* Willd. ex Fr.; *P. gilvus* (Schw.) Fr.; *P. hirsutus* Wulf. ex Fr.; *P. pubescens* Schum. ex Fr.; *P. supinus* Sw. ex Fr.—Fla.; *P. tulipiferus* (Schw.) Overh.; *P. versicolor* L. ex Fr.
Poria spp., wood rots: *P. holoseparans* Murr.—Fla.; *P. punctata* (Fr.) Cke.—Ark., La.; *P. versipora* Pers. ex Rom.—Mich.
Rhizoctonia solani Kuehn, damping-off. Mo.
Rosellinia aquila (Fr.) de N., on dead wood. Ga.
R. pulveracea (Ehr. ex Fr.) Fckl.—Va.
Schizophyllum commune Fr., wood rot. Cosmopolitan.
Septobasidium spp., brown felt (on scale insects on twigs): *S. curtisii* (Berk. & Desm.) Boed. & Steinm.—Va. to Fla. and La.; *S. filiforme* Couch—N.C.; *S. hesleri* Couch—Tenn.; *S. langloisii* Pat.—Fla.; *S. pseudopedicellatum* Burt—Fla., N.C., Tenn., Va.; *S. sinuosum* Couch—N.C. All records on (1).
Sphaerognomonia carpinea (Fr.) Poteb., leaf spot. Ga., N.Y., Pa., W. Va., Wis. (1). Also reported as *Gloeosporium robergei*.
Steccherinum adustum (Schw.) Banker, wood rot. Conn. (1).
S. ochraceum (Pers. ex Fr.) S.F.Gray—Va. (1).
Stereum spp., various wood rots, usually on dead trunks and branches; distribution as noted or general: *S. fasciatum* Schw.; *S. gausapatum* Fr.; *S. murrayi* (Berk. & Curt.) Burt—Va.; *S. rameale* Schw.; *S. sericeum* Schw.; *S. umbrinum* Berk. & Curt.—Va. All records on (1).
Taphrina australis (Atk.) Gies., leaf blister. Ala., Conn., Ky. (1).

Corylus, hazelnut, filbert

I. Native Species

(1) *Corylus americana* Marsh., American hazelnut. Range 15,18,21–29.
(2) *C. cornuta* Marsh. (*C. rostrata* Ait.), beaked hazelnut. Range 15,18,21–29.
(3) *C. californica* (A.DC.) Bose, California hazelnut. Range 1,2,3,4.

Small to large, thicket-forming shrubs, useful in erosion control and important food plants of wildlife.

Apioporthe anomala (Pk.) Hoehn., canker, dieback. N.Y. to Iowa and Wis. (1); N.Y. (2).
Armillaria mellea Vahl ex Fr., root rot. Calif. (3).
Catinula turgida (Fr.) Desm.: SEE *Pezicula corylina*.
Cenangium furfuraceum (Roth) Sacc., on dead branches. N. Dak. (1).
Cercospora corylina Ray, leaf spot. Okla. (2).
Cucurbitaria conglobata (Fr.) Ces. & de N. (*?C. coryli* Fckl.), on dead branches. N.Y., Pa. (1,2).
Cylindrosporium vermiformis J.J.Davis, leaf spot. Wis. (1).
Diaporthe decedens (Fr.) Fckl., on dead branches. Iowa, Mich., N.Y. (1,2).
Diatrypella frostii Pk., on dead branches. N. Dak. (1).
D. minutispora Dearn.—N.Y. (2).
D. missouriensis Ell. & Ev.—Mo., N.Y. (1).
Diplodia coryli Fckl., on dead twigs. Mich. (1).
Dothidea corylina Cke. & Harkn., on branches. Calif. (3).
Gloeosporium coryli (Desm.) Sacc., leaf spot. Mich., Okla., Wis. (1); N.J., N.Y., Vt., Wis. (2); Oreg., Wash. (3).
G. rostratum Ell. & Ev.—Wash. (2).
Gnomoniella coryli (Batsch ex Fr.) Sacc., leaf spot. General (*). Also var. *spiralis* Pk.—Ill. (1); Mich. (2).
G. gnomon (Tode ex Fr.) House—Ga., N.Y. (1).
Hymenochaete agglutinans Ell. & Ev., on base of branches, ? collar rot. Maine (2).
H. cinnamomea Pers. ex Bres., on dead branches. N. Dak. (1).
Hypoxylon fuscum Pers. ex Fr., on dead branches. Mich. (1).
Melanconis flavovirens (Otth) Wehm. (*Myxosporium sulphureum* Sacc.), on dead branches. Iowa (1,2).
Microsphaera alni DC. ex Wint., powdery mildew. Northeastern and North Central States (1,2).
Nectria coryli Fckl., on dead branches. N.J., N.Y. (2).
Pezicula corylina Groves, on dead branches. N.H., N.Y. (2).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Northeastern and North Central States (1,2); Oreg., Wash. (3).
Phyllosticta coryli West., leaf spot. Ind., Iowa, Mo., Tex. (1); Wash. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Physalospora obtusa (Schw.) Cke., on dead branches. N.J. (1), Calif. (3).
Polyporus spp., on dead wood; rare, but the following are reported: *P. albellus* Pk., *P. elegans* Bull. ex Fr., *P. radiatus* Sow. ex Fr., *P. stereoides* Fr. ex Rom. (*?Trametes mollis* (Sommerf.) Fr.) (1,2).
Poria ferrea (Pers.) Bourd. & Galz., wood rot. Calif. (3).
Scolecosporium coryli Dearn. & House, on leaves. N.Y. (1).
Scorias spongiosa (Schw.) Fr., on leaves and twigs following aphid or scale infestation. Md. (1).
Septogloeum profusum (Ell. & Ev.) Sacc., leaf spot. Ind., Mass., Miss., (1).
Septoria corylina Pk., leaf spot. Mich., Nebr., Wis. (1); Mass. to N.J. and Wis. (2); Oreg., Wash. (3).
Sphaeropsis coryli Ell. & Ev., on dead branches. N.J., N.Y. (1,2).
Stereum rameale Schw., on dead wood. Wash. (3).
Taphrina coryli Nishida, leaf blister, curl. Conn. (1,2); Mass., Wis. (1).
Valsa ambiens Pers. ex Fr., on dead branches. N.Y. (1), Oreg. (3).
Xanthomonas coryli P.W.Miller et al., bacterial blight. Oreg. (3).
Xylaria hypoxylon (L. ex Fr.) Grev., on dead wood, ?root rot. Wash. (3).

II. Introduced Species

(1) *Corylus avellana* L., European hazelnut. Zone 3.
(2) *C. colurna* L., Turkish hazelnut. Zone 4.
(3) *C. maxima* Mill., filbert. Zone 4.

Large shrubs or small trees, cultivated for edible nuts or ornament.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Wash. (1).
Apioporthe anomala (Pk.) Hoehn., canker, twig blight. Conn., Del., Ill., Mass. (1).
Armillaria mellea Vahl ex Fr., root rot. Oreg., Wash. (1).
Diaporthe decedens (Fr.) Fckl., on nuts. N.Y. (1).
Diplodia sarmentorum Fr., on twigs. Oreg. (1).
Gloeosporium coryli (Desm.) Sacc., leaf spot. N.J. (1).
Pezicula corylina Groves, on twigs. Pa. (1).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Oreg., Wash. (3).
Physalospora ?obtusa (Schw.) Cke., on branches. Calif. (1).
Pseudomonas colurnae (Thornberry & H.W.Anderson) Burkh., bacterial spot. Ill. (2).
Sphaerognomonia carpinea (Fr.) Poteb., leaf spot. Ga. (3).
Sphaeropsis coryli Ell. & Ev., on branches. N.J. (1).
Taphrina coryli Nishida, leaf blister. Pa. (1).
Xanthomonas coryli P.W.Miller et. al., bacterial blight. Oreg., Wash. (1,3).
BITTER ROT (of kernels)—cause unknown. Oreg., Wash. (1).
BROWN STAIN (of nuts)—cause unknown. Oreg., Wash. (1).
SHRIVEL, "BLANKS"—pollination failure. Oreg., Wash. (1).

Ostrya, ironwood, hophornbeam

(1) *O. virginiana* (Mill.) K.Koch, including var. *glandulosa* (Spach) Sarg., eastern hophornbeam. Range 15,18,20,21,22,23,24, 25,26,27,28,29,30.
(2) Other species (mostly *O. carpinifolia* Scop., European hophornbeam and other introduced species).

Small to medium trees: (1) furnishing commercially useful wood and food for wildlife, cultivated, zone 4; the introduced species less hardy (zone 5), but more frequently cultivated.

Aleurodiscus spp., on bark of branches and trunks, sometimes of living trees: *A. griseo-canus* (Bres.) Hoehn. & Litsch.—Iowa, Mo.; *A. oakesii* (Berk. &

Curt.) Cke.—Ala., Iowa, Mo., N.Y., Ohio, W. Va., Wis.; *A. strumosus* (Fr.) Burt—Fla. All records on (1).
Armillaria mellea Vahl ex Fr., root rot.
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches. Ga. (1).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1).
Cylindrosporium dearnessii Ell. & Ev., leaf spot. Va. (1).
Daedalea confragosa Bolt. ex Fr. and *D. unicolor* Bull. ex Fr., wood rot. Vt. (1).
Daldinia loculata (Lév.) Sacc., on dead branches. Ga. (1).
Diaporthe eres Nits., on dead branches. Nebr., N.Y. (1).
Diatrype spp., on dead branches: *D. albopruinosa* (Schw.) Cke.—Miss.; *D. americana* Ell. & Ev. f. *ostryae* Rehm—N. Dak.; *D. platystoma* (Schw.) Curt.—Ala.; *D. stigma* Hoffm. ex Fr.—N.Y. (1).
Fomes spp., various wood rots, sometimes on living trees; distribution as noted or general: *F. applanatus* (Pers. ex Wallr.) Gill.; *F. conchatus* (Pers. ex Fr.) Gill.—Vt.; *F. connatus* (Weinm. ex Fr.) Gill.—Mass., Vt.; *F. everhartii* (Ell. & Gall.) Schrenk—Wis.; *F. igniarius* (L. ex Fr.) Kickx, white spongy heart rot—Mich., N. Dak., S. Dak., Vt.; *F. ohiensis* Berk.—Iowa.
Fusarium lateritium Nees ex Fr., on twigs, ?dieback. Ohio (1).
Gloeosporium robergei Desm., leaf spot. N.J., N.Y., Okla., Pa., Wis. (1).
Gnomoniella fimbriata (Pers. ex Fr.) Sacc., on leaves. Maine, Mass., N.Y.
G. gnomon (Tode ex Fr.) House—Ga., N.Y.
Hypoxylon spp., on dead wood, the following commonly reported: *H. atropunctata* Schw. ex Fr.—Ga.; *H. fuscum* Pers. ex Fr.—Ala., Ind.; *H. howieanum* Pk.—N.Y.; *H. hypophlaeum* (Berk. & Rav.) J.H.Miller—Ga.; *H. marginatum* (Schw.) Berk.—Ala.; *H. rubiginosum* Pers. ex Fr.—Ga. All records on (1).
Melampsoridium carpini (Nees) Diet. (II,III), rust. N.Y. (1). O and I unknown.
Melanconis ostryae (Dearn.) Wehm., on branches. Iowa, Mich., Nebr., N.Y. (1).
Microsphaera alni DC. ex Wint., powdery mildew. N.Y. to Iowa and Wis. (1).
Mycoacia himantia (Schw.) L.W.Miller & Boyle, wood rot. Mass. (1).
Nectria sp. (*?N. galligena* Bres.), canker. N.Y. (1).
Phyllactinia corylea Pers. ex Karst., powdery mildew. N.Y. to Fla., Tex., and Wis. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora obtusa (Schw.) Cke., on branches. Ga., N.Y. (1).
Pleurotus similis Pk., ?sapwood rot. N.Y. (1).
Polyporus spp., various wood rots: *P. adustus* Willd. ex Fr.; *P. cuticularis* Bull. ex Fr.—Ind.; *P. hirsutus* Wulf. ex Fr.—Vt.; *P. versicolor* L. ex Fr.—Vt. All records on (1).
Poria spp., various wood rots, sometimes on living trees: *P. ambigua* Bres.; *P. ferruginosa* (Schrad. ex Fr.) Karst.; *P. obliqua* (Pers. ex Fr.) Bres.—Pa.; *P. punctata* (Fr.) Cke.—Ohio, Pa., Vt. All records on (1).
Rhizoctonia solani Kuehn, damping-off. Mo.
Rosellinia aquila (Fr.) de N., on dead branches. Ind., Iowa (1).
R. ligniaria (Grev.) Nits.—Ind.
Septobasidium spp., brown felt (on scale insects on twigs and branches): *S. curtisii* (Berk. & Desm.) Boed. & Steinm.—Tenn.; *S. pseudopedicellatum* Burt—Fla.; *S. rugulosum* Couch—Fla.; *S. sinuosum* Couch—Fla. All records on (1).
Septoria ostryae Pk., leaf spot. Iowa, N.Y., Wis. (1).
Sphaerognomonia carpinea (Fr.) Poteb., on fallen leaves. Ga. (1).
Stereum spp., wood rot: *S. albobadium* (Schw.) Fr.—Md.; *S. murrayi* (Berk. & Curt.) Burt—Pa.; *S. rameale* Schw.—Md. (1).
Strumella coryneoidea Sacc. & Wint., trunk canker. Md., Pa., W. Va. (1). Conidial stage of *Urnula craterium* (Schw.) Fr.
Taphrina virginica Sadeb., leaf curl, blister. N.H. to Fla., Tex., and Wis. (1).
Trametes mollis (Sommerf.) Fr., wood rot. N.Y., Vt. (1).
Uncinula macrospora Pk., powdery mildew. Mich., Wis. (1).
Valsa ambiens Pers. ex Fr., on dead branches. Miss. (1).

BIGNONIACEAE

Bignonia

B. capreolata L., crossvine.
Evergreen, tall-climbing vine. Range 25,28, 29,30; cultivated for ornament, zone 5.
B. radicans (L.) DC.: See *Campsis radicans.*

Asterina bignoniae Ell. & Ev., black mildew. La.
Capnodium elongatum Berk. & Desm., sooty mold. Ala., Miss.
Cercospora capreolata Ell. & Ev., leaf spot. Ala., Miss.
Dothidea collecta (Schw.) Ell. & Ev., on stems. Ga.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Leptostromella bignoniae Dearn., leaf spot. Tenn.
Meliola bidentata Cke., black mildew. Gulf States.
M. furcata Lév.—Fla.
Meloidogyne sp., root knot nematodes. Md.
Physalospora obtusa (Schw.) Cke., on stems. Ala. Probably includes reports of *Dothidea capreolata* Schw. in N.C. and *Botryosphaeria fuliginosa* (Moug. & Nestl.) Ell. & Ev. in La.
Sphaceloma sp., spot anthracnose. La.

Campsis

C. radicans (L.) Seem., trumpetcreeper, trumpetvine. Range 20,22,25,27,28,29,30.
Climbing shrub, cultivated in several varieties for ornament, zone 4.

Ascochyta tecomae Sacc., on stems. N.Y.
Cercospora duplicata Ell. & Ev., leaf spot. La.
C. langloisii Sacc.—La., Tex.
C. sordida Sacc.: See *Mycosphaerella tecomae.*
Diplodia tecomae Pass., on stems. La. Probably *Physalospora.*
Ellisiodothis inquinans (Ell. & Ev.) Th., on stems. Ga.
Erysiphe cichoracearum DC., powdery mildew. Ill.
Microdiplodia minuta (Ell. & Tracy) Tassi, on stems. Miss.
Microsphaera alni DC. ex Wint., powdery mildew. Md. to Ala., Tex., and Ind.
Mycosphaerella tecomae Wolf, leaf spot. General.
Myrothecium roridum Tode ex Fr., leaf spot. Tex.
Pestalotia breviaristata Tracy & Earle, on stems. Miss.
Phomopsis majuscula Sacc., on stems. N.Y.

Phoradendron flavescens (Pursh) Nutt., mistletoe. Tex.
Phyllosticta tecomae Sacc., leaf spot. Miss. Perhaps a spermatial stage of *Mycosphaerella tecomae.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora abdita (Berk. & Curt.) N.E.Stevens, on stems. N.J., Va. *P. obtusa* (Schw.) Cke.—Ga.
Rhabdospora translucens Fairm., on stems. N.Y.
Septoria tecomae Ell. & Ev., leaf spot. Okla., Tex., W. Va.
S. tecomaxochitl Tehon & Stout—Ill.
Sphaeropsis tecomae Dearn., on stems. N.Y., Va. SEE ALSO *Physalospora.*
Valsaria bignoniae (Schw.) Cke., on stems. Pa.

Catalpa

(1) *C. bignonioides* Walt., southern catalpa. Range 22,25,27,28,29,30.
(2) *C. speciosa* Warder, northern catalpa. Range 21,22,23,25,29.

Medium to large trees, cultivated for ornament and shade, zone 4, (2) somewhat hardier; wood used commercially, chiefly for posts.

(3) Other species, chiefly *C. bungei* C.A.Mey. and *C. ovata* Don, of China, and hybrids of these with (1).

Alternaria sp. (*?A. catalpae* (Ell. & Martin) J.B. Parker), leaf spot (secondary?). Mass. to Ala., Tex., and Ill. (*).
Armillaria mellea Vahl ex Fr., root rot. Wash. (2).
Ascochyta catalpae Tassi, on leaves. Ill., Pa. (2).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on twigs, ?canker. Md. (1).
Capnodium axillatum Cke., sooty mold. La., S.C. (2).
Cercospora catalpae Wint., leaf spot. Mass. to Fla., Tex., and Iowa (1,2).
Collybia velutipes W.Curt. ex Fr., wound rot. Ind. (2).
Didymosphaeria catalpae J.B.Parker, on leaves. Ohio (1). Associated with *Phyllosticta catalpae.*
Eutypella fraxinicola (Cke. & Pk.) Sacc., on dead branches. Ga. (1).
Gloeosporium catalpae Ell. & Ev., anthracnose. Md., Mass., N.J., N.Y., Pa. (1,2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Hypoxylon rubiginosum Pers. ex Fr. (*H. perforatum* (Schw.) Curt.), on dead branches. Ga., Pa. (1,2).
Meloidogyne sp., root knot nematodes. Southern States to Ohio and Okla. (1,2); Md. (3).
Microsphaera alni DC. ex Wint. var. *vaccinii* (Schw.) Salm. (*M. elevata* Burr.), powdery mildew. Mass. to Ala., Tex., and Nebr. (1,2); N.J. (3).
Mycosphaerella sp., on leaves. Ga. (1).
Phomopsis sp., on twigs, dieback. Fla., Ohio (1). Probably a conidial stage of *Diaporthe eres* Nits.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Ill., Ind., Ohio, S.C., Va. (1); Ind., Ky., Mass. (2).
Phyllosticta catalpae Ell. & Martin, leaf spot. General (1,2). Sometimes reported as *P. bignoniae* West., of which this may be a synonym.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2); Okla. (2).
Physalospora obtusa (Schw.) Cke., on branches. Ala., Md.
P. rhodina (Berk. & Curt.) Cke. (*Diplodia natalensis* P.Evans)—Ala.
Polyporus spp., various wood rots, sometimes on living trees: *P. adustus* Willd. ex Fr.—Ohio (2); *P. catalpae* Schrenk (nomen nudum), brown butt rot. Kans., Mo. (2); *P. hirsutus* Wulf. ex Fr., white sapwood rot. Ohio (2); *P. versicolor* L. ex Fr., spongy yellow heart rot. Mass. to Ind., Kans., and Wis. (1,2).
Pythium ultimum Trow, damping-off (somewhat resistant). Kans.
Rhabdospora baculum (Gerard) Grove, on branches. N.J., N.Y.
Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot of seedlings. Ohio.
R. solani Kuehn, damping-off. Nebr.
Schizophyllum commune Fr., sapwood rot. Cosmopolitan (*).
Sclerotium rolfsii Sacc., southern blight (seedlings). Tex. (2).
Sphaceloma sp., spot anthracnose. La.
Stereum spp., wood rot of trunks and branches: *S. albobadium* (Schw.) Fr.: *S. fasciatum* Schw.; *S. hirsutum* Willd. ex Fr. Reported from Ind., Mo., Ohio, but doubtless general.
Thielaviopsis basicola (Berk. & Br.) Ferr., black root rot (seedlings). Ohio (2).
Trametes sepium Berk., brown crumbly sapwood rot. Kans.
Verticillium albo-atrum Reinke & Berth., wilt. Ill., N.J., N.Y. (1,2); (?) Ind., Kans., Mass., Ohio, Va.
CHLOROSIS—mineral deficiency attributed to soil alkalinity. Nebr., Tex., Wash.
LEAF SCORCH—physiological, attributed to heat and drought. Chiefly in the Middle West.

Chilopsis

C. linearis (Cav.) Sweet, desert-willow. Range 5,9,10,11,16,17,20.

Small tree, sometimes grown for ornament, zone 7; useful in erosion control; useful to wildlife.

Phyllosticta erysiphoides Sacc., leaf spot.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pythium ultimum Trow, damping-off. Nebr.
Rhizoctonia solani Kuehn, damping-off. Nebr., Tex.

Cydista

C. aequinoctialis (L.) Miers.

Woody climber of tropical America, sometimes grown for ornament.

Meliola cydistate F.L.Stevens, black mildew. C.Z.
Prospodium aequinoctialis (Holw.) Cumm. (II,?III), rust. P.R. O and I unknown.
Cephaleuros virescens Kunze, green scurf. P.R.

Doxantha

D. unguis-cati (L.) Rehd. (*Bignonia unguis-cati* L.)

Woody vine of tropical America, sometimes grown for ornament under glass or in the open in the Far South.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Jacaranda

J. acutifolia Humb. & Bonpl.

South American tree grown for ornament in warm regions.

Armillaria mellea Vahl. ex Fr., root rot. Calif.
Phymatotrichum omvivorum (Shear) Dug., root rot. Tex.

Podranaea

P. ricasoliana (Tanf.) Sprague
Evergreen shrub of Africa, grown for ornament in the Far South.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla.

Stenolobium

S. stans (L.) D.Don (*Tecoma stans* (L.) Juss.), Florida yellowtrumpet (yellow-elder). Range 10,11,17,20,29,30.
Flowering shrub or small tree of tropical and subtropical America, cultivated in zone 7.

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Prospodium appendiculatum (Wint.) Arth. (O,I,II,III), rust. Fla., Tex., P.R., V.I.

Tabebuia, trumpettree

(1) *T. pentaphylla* (L.) Hemsl. (?*T. pallida* (Lindl.) Miers) whitewood trumpettree.
(2) *T. serratifolia* (Vahl) Nichols
(3) Other species.
Evergreen trees of tropical America, grown for ornament in the Far South; the wood of (1) is used commercially.

Apiosphaeria guaranitica (Speg.) Hoehn., black leaf spot. C.Z. (1).
Meliola bidentata Cke., black mildew. P.R. (1,3).
M. tecomae F.L.Stevens—P.R. (1).
Mycosphaerella tabebuiae Miles, leaf spot. P.R. (3).
Prospodium plagiopus (Mont.) Arth. (II,III), rust. Fla. (3).
P. tabebuiae Kern (II, III)—P.R. (1). O and I of both species unknown.
WITCHES'-BROOM — cause unknown, virus suspected. P.R. (1).

Tecomaria

T. capensis (Thunb.) Spach, cape-honeysuckle
Evergreen shrub of South Africa, grown for ornament and in hedges, zone 7.

Armillaria mellea Vahl ex Fr., root rot. Calif.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Colletotrichum gloeosporioides Penz., anthracnose. Tex.

BIXACEAE

Bixa

B. orellana L., anatto-tree.
Small tree of tropical America, grown for ornament and for a dye obtained from the fruit.

Cephaleuros virescens Kunze, green scurf. Fla.

Cercospora bixae Allesch. & Noack, leaf spot. P.R.

Phyllosticta bixina E. Young, leaf spot. P.R.

Uredo bixae Arth. (II), rust. P.R.

BORAGINACEAE

Anchusa

(1) *A. officinalis* L., alkanet, bugloss.
(2) Other species.
Hardy biennial or perennial herbs of southern Europe and Africa, grown for ornament.

Puccinia rubigo-vera (DC.) Wint. var. *secalis* (Eriks.) Carl. (O,I), rust. Ind. (1,2), Mich. (1). II and III on *Secale cereale* L.
Rhizoctonia solani Kuehn, damping-off. Conn. (2).
MOSAIC—unidentified virus. Ind. (1). Susceptibility to aster yellows virus (*Chlorogenus callistephi* Holmes) and to beet curly-top virus (*Ruga verrucosans* Carsner & Bennett) by experimental inoculation has been demonstrated in *A. capensis* Thunb. and *A. azurea* Mill.

Borago

B. officinalis L., borage.
Annual of Mediterranean region, grown for ornament and as a honey plant.

Ramularia sp., leaf spot. Calif.

Cordia

(1) *C. boissieri* DC., anacahuita. Range 11,17.
(2) Other species.
Evergreen shrubs or small trees of tropical America and southern Florida, grown for ornament, and the wood of some used commercially.

Alveolaria cordiae Lagh. (III), rust. C.Z. (2).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (2).
Cryptospora panamensis (F.L.Stevens) Syd., black leaf spot. C.Z. (2).
Diatractium cordiae (F.L.Stevens) Syd., on branches. P.R., V.I. (2).
Dimeriella cordiae (P.Henn.) Th., black mildew. P.R. (2).
Dimerium stevensii Garman, black mildew. P.R. (2).
Elsinoë mayaguensis Bitanc. & Jenkins, spot anthracnose. P.R. (2).
Erysiphe cichoracearum DC., powdery mildew. Tex. (1).
Meliola longipoda Gaill., black mildew. P.R. (2).
Phyllachora orbicularis Speg., black leaf spot. P.R. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Puccinia cordiae (P.Henn.) Arth. (O,II,III), rust. P.R. (2).
Seynesia cordiae Ryan, black leaf spot. P.R. (2).
Stevensiella cordiae (F.L.Stevens) Trott., on leaves. P.R. (2).

Cryptantha

Cryptantha spp.
Numerous annual or perennial herbs, chiefly in dry, open ground in the Southwestern States; some of minor forage value; useful to wildlife.

Erysiphe cichoracearum DC., powdery mildew. Calif., Nev.
Puccinia aristidae Tracy (O,I), rust. Ariz. II and III on native grasses, especially *Aristida* and *Distichlis*.
P. cryptanthes Diet. & Holw. (II,III), rust. Calif., Wash. O, I unknown.
Synchytrium myosotidis Kuehn, leaf gall. Ariz., Calif.

Cynoglossum, houndstongue

(1) *C. amabile* Stapf & Drum
(2) *C. zeylanicum* (Vahl) Thunb.
(3) *C. officinale* L.
(4) *C. virginianum* L.

Biennial or perennial herbs: (1,2,3) of eastern Asia, (4) native in the Eastern and Central States; grown for ornament (1,2) or naturalized in waste ground in eastern and central United States, becoming a weed (3); all are minor honey plants.

Cercospora cynoglossi Van Hook, leaf spot. Ind. (3).
Erysiphe cichoracearum DC., powdery mildew. Utah, Wyo. (3); Va. (4). Perhaps should be *E. horridula* (Wallr.) Lév., thougn commonly reported as this.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.
Peronospora cynoglossi Burr., downy mildew. Md., Ill., Tex. (3).
Phoma cynoglossi Dearn., on stems. Tex., N.Y. (3).
Phyllosticta decidua Ell. & Kell., leaf spot. Tex., Wis. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Ramularia lappulae J.J.Davis, leaf spot. Tex., Wis. (3).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Wash. (1).
Sclerotium rolfsii Sacc., southern blight. Fla. (1,2).

Echium

E. vulgare L., blueweed, vipers-bugloss.

Biennial herb of Europe, extensively naturalized in the Eastern and Central States; sometimes a weed but a minor honey plant.

Cercospora echii Wint., leaf spot.
Rosellinia sp. (*?R. necatrix* (Hartig) Berl.), root rot. Calif.

Heliotropium, heliotrope

(1) *H. arborescens* L. (*H. peruvianum* L.), common heliotrope.
(2) *H. curassavicum* L., salt or seaside heliotrope.

Perennial woody herb of Peru (1), or succulent herb of tropical America occurring in several variant forms on the Atlantic and gulf coasts and the Southwestern Plains (2); (1) is grown for ornament, under glass or as an annual out of doors; (2) is useful to wildlife.

Botrytis cinerea Pers. ex Fr., leaf spot, shoot blight. Cosmopolitan under cool moist conditions. (1).
Cercospora heliotropii Ell. & Ev., leaf spot. N. Mex., Oreg. (2).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Mass., Wash. (1).
Puccinia aristidae Tracy (O,I), rust. Ariz., Calif., Nev., N. Mex., Tex., Utah (2). II and III on native grasses.
Sclerotium rolfsii Sacc., southern blight. P.R. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Md. (1).

Lappula

I. Annual Species, Stickseed

(1) *Lappula echinata* Gilib.
(2) *L. redowskii* (Hornem.) Greene

European herb widely naturalized in the Eastern and Central States and often a troublesome weed (1), or native plants of the Western Plains (2); useful to wildlife.

Erysiphe cichoracearum DC., powdery mildew. Calif., Mont., Tex., Wyo. (2). See note on this species under section II.
Peronospora echinospermi Swing., downy mildew. Tex., N. Dak. (1); Kans., Mont., Nebr. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Puccinia aristidae Tracy (O,I), rust. Ariz., Colo., Utah (2). II and III on native grasses.

II. Biennial Species (Often Referred to *Hackelia*)

(1) *Lappula floribunda* (Lehm.) Greene
(2) L. *virginiana* (L.) Greene
(3) Other species.

Widely distributed herbs: (1) chiefly western but sometimes grown for ornament, (2) throughout the Eastern and Central States, sometimes a troublesome weed.

Cercospora cynoglossi Van Hook, leaf spot. Wis. (2).
Entyloma serotinum Schroet., leaf smut. Utah (1).
Erysiphe cichoracearum DC., powdery mildew. Iowa, Mich., Minn., Mo., Ohio, Wis. (2); Tex. (3). Perhaps should be *E. horridula* (Wallr.) Lév., though commonly reported as this.
Microsphaera sp., powdery mildew. Ill. (2).
Ovularia asperifolii Sacc. var. *lappulae* J.J.Davis, leaf spot. Wis. (2).
Peronospora echinospermi Swing., downy mildew. Iowa (2), Tex. (3).
P. myosotidis dBy. Mont. (1).
Phyllosticta decidua Ell. & Kell., leaf spot. Wis. (2), Tex. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Puccinia mertensiae Pk. (III), rust. Utah (1), Tex. (3).

Lithospermum, puccoon, gromwell

(1) *L. angustifolium* Michx.
(2) *L. canescens* (Michx.) Lehm.
(3) *L. ruderale* Dougl.
(4) *L. tuberosum* Rugel
(5) *L. arvense* L.

Native perennial herbs of prairies and open woods, mostly in the Central and Western States (1,2,3,4), or naturalized from Europe and weedy (5); some have showy flowers and are grown in rock gardens; useful to wildlife.

Aecidium hesleri Arth. (O,I), rust. Tenn. (4).

Cercosporella herpotrichoides Fron, on roots. Idaho, Oreg., Wash. (3).
Erysiphe cichoracearum DC., powdery mildew. Pa., Tex. (5).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (5).
Puccinia rubigo-vera (DC.) Wint. var. *apocrypta* (Ell. & Tracy) Arth. (O,I), rust. N. Dak., Nebr., S. Dak. (1); N. Dak. (2); Tex. (5).
Septoria lithospermi J.J.Davis & Greene, leaf spot. Wis. (2).

Mertensia, bluebells

(1) *M. virginica* (L.) DC., Virginia cowslip.
(2) *M. ciliata* (Torr.) G.Don
(3) *M. laevigata* Piper
(4) *M. lanceolata* (Pursh) DC.
(5) *M. paniculata* (Ait.) G.Don
(6) Other species.

Perennial herbs: (1) in moist woodlands in the Eastern and Central States, often grown in gardens; the others in the Western States, several of ornamental value.

Entyloma serotinum Schroet., leaf smut. Ind., Iowa, Md., Va. (1); Wyo. (2).
Erysiphe cichoracearum DC., powdery mildew. Pa. (1); Colo., Mont., Nev., N. Mex., Utah, Wyo. (2,6).
Peronospora sp., downy mildew. Mont. (2).
Puccinia mertensiae Pk. (III), rust. Colo., Nev., Utah, Wyo. (2,6).
P. rubigo-vera (DC.) Wint. var. *apocrypta* (Ell. & Tracy) Arth. (O,I)—Idaho (3,5); Mont. (5); Oreg. (3,6). II and III on *Agropyron* and *Elymus* spp.
Sclerotinia sclerotiorum (Lib.) dBy., stem rot. Colo. (4).
Septoria poseyi Sprague, leaf spot. Oreg. (3).
MOSAIC—virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.). Ill., N.J. (6).

Myosotis

(1) *M. scorpioides* L.
(2) *M. sylvatica* Hoffm., forget-me-not.

Annual or biennial herbs of Europe, long cultivated and widely escaped: (1) naturalized in the East, South, and California; (2) more common in gardens.
(3) *M. laxa* Lehm.
(4) *M. virginica* (L.) B.S.P.

Small native herbs of the Eastern and North Central States; (3) a wildlife-food plant.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Cosmopolitan (1,2).
Peronospora myosotidis dBy., downy mildew. Wis. (3,4); Ill., Mich., Miss. (4).
Puccinia eatoniae Arth. var. *myosotidis* Mains (O,I), rust. Ill., Ind., ?Miss., Mo., N. C., Wis. (4). II and III on *Sphenopholis* spp.
P. mertensiae Pk. (III), rust. Colo.
Sclerotinia sclerotiorum (Lib.) dBy., crown rot. Ill., Wash. (1,2).
CHLOROSIS—suspected virus. Ga. (1).
YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1 A K.M.Sm.). Calif. (1). Perhaps also the eastern strain of this virus reported as chlorosis in Ga. Experimental susceptibility to beet curly top virus has been shown.

Onosmodium

O. molle Michx. var. *occidentale* (Mack.) Johnston, marbleseed.

Perennial herb of prairies and plains in the North Central and Western States, sometimes grown in wild gardens; useful to wildlife.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia rubigo-vera (DC.) Wint. var. *apocrypta* (Ell. & Tracy) Arth. (O,I), rust. Colo., Kans., N. Dak., Nebr. The form on this host has also been designated *P. rubigo-vera* sp.f. *onosmodii* Mains.

BROMELIACEAE

Ananas

A. comosus (L.) Merr., pineapple.

Perennial herb of tropical America, widely cultivated in tropical and subtropical regions for edible fruit; some forms also grown for ornament. Grown commercially in Hawaii and Puerto Rico, and occasionally in southern Florida.

Aphanomyces sp., root rot. T.H.
Asterinella stuhlmanni (P. Henn.) Th., leaf spot. P.R., V.I.
Ceratostomella paradoxa Dade (*Thielaviopsis paradoxa* (De Seyn.) Hoehn.). Leaf-base rot, white leaf spot, soft rot of fruit. General in tropical America, also in Fla. and T.H.
Fusarium sp. (*?F. moniliforme* Sheldon), brown rot of fruit, bud rot, secondary root rot. P.R., T.H.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Hymenula affinis (Fautr. & Lambotte) Wr., secondary root rot. T.H.
Meloidogyne sp., root knot nematodes. Fla., T.H. An important factor in decline of commercial pineapple culture in Fla.
Penicillium spp., blue mold (on fruit). Cosmopolitan. Reported also as sometimes causing internal brown rot.
Phytomonas ananas Barker, fruitlet black rot. P.R. Antedates *Phytomonas ananas* Serrano (=*Pseudomonas ananas*, reported in the Philippine Islands) and probably differs from it and *Erwinia ananas* Serrano.
Phytophthora spp., heart rot of stems and buds, root rot. T.H.: *P. parasitica* Dast., *P. cinnamomi* Rands, and *P. palmivora* Butl., cause heart rot and root rot; the first 2 species also cause green fruit rot. *P. parasitica* also causes leaf-base rot in the West Indies. *P. citrophthora* (R.E.Sm. & E.H.Sm.) Leonian and *P. drechsleri* Tucker are also reported on this host in T.H.
Pratylenchus pratensis (De Man) Filip., root nematode. T.H.
Pseudopythium phytophthoron Sideris: SEE *Phytophthora cinnamomi.*
Pythium spp., root rot, wilt (in part). T.H. *P. arrhenomanes* Drechs. is predominantly implicated; other species identified are: *P. aphanidermatum*

(Edson) Fitz., *P. acanthophoron* Sideris, *P. artotrogus* (Mont.) d By., *P. debaryanum* Hesse, *P. graminicola* Subr., *P. indigoferae* Butl., *P. irregulare* Buis., *P. mamillatum* Meurs, *P. megalacanthum* d By., *P. polymorphon* Sideris, *P. rostratum* Butl., *P. splendens* Braun, and *P. vexans* d By.

Rhizidiocystis ananasi Sideris, in root hairs. T.H.

Rhizoctonia sp. (*?R. solani* Kuehn), root rot. T.H.

Rhizopus stolonifer (Ehr. ex Fr.) Lind, fruit rot. T.H.

Rotylenchus multicinctus (Cobb) Filip., root nematode. Hawaii. *R. similis* (Cobb) Filip. also has been reported but perhaps doubtfully. *R. reniformis* Linford & Oliviera—T.H.

Thielaviopsis paradoxa (De Seyn.) Hoehn.: SEE *Ceratostomella paradoxa*.

Tylenchus brachyurus Godfrey, root nematode. T.H.

Trichoderma viride Pers. ex Fr., secondary fruit mold. T.H.

YELLOW SPOT—virus (*Lethum australiense* Holmes, Ananas virus 1 (Lycopersicum virus 3) K.M.Sm.). T.H. Similar symptoms are induced by artificial inoculation of pineapple with cucumber mosaic virus, but natural infection has not yet been reported.

CHLOROSIS—mineral deficiency, chiefly of iron, associated with calcareous soils or sometimes (T.H.) with excess of manganese. P.R., T.H.

GREEN SPOT—local spotting of foliage attributed to feeding injury of mealy bugs (*Pseudococcus brevipes* Cockerell). T.H., especially when certain symbionts of the insect are present.

MEALY BUG WILT—toxic effect of feeding of mealy bugs (*Pseudococcus brevipes*). Fla., P.R., T.H.

SPIKE (long leaf)—cause unknown but believed physiological, perhaps due to acid-reacting fertilizers. Fla., P.R.

WHITE SPOT—chlorotic spotting of foliage induced by insect punctures with secondary *Thielaviopsis* infection.

WILT—a complex disease associated with various biological agents as fungi (*Pythium, Phytophthora, Rhizoctonia*), and nematodes (*Heterodera* and *Tylenchus*, q.v.), in T.H. caused chiefly by mealy bugs.

YELLOWS—form of chlorosis caused by manganese toxicity. T.H.

Bromelia

(1) *B. pinguin* L., pinguin.
(2) Other species.

Tropical American herbs grown for ornament.

Echidnodes bromeliae Ryan, on leaves. P.R. (2).

Gloeosporium sp., leaf spot. Fla., Md. (2).

Marasmius sacchari Wakker, collar rot. P.R. (1).

Toroa dimerosporioides (Speg.) Syd., on leaves. P.R. (1).

Tillandsia

(1) *T. usneoides* L., Spanish-moss.
(2) *T. recurvata* L., ball-moss.

Pendulous epiphytes on forest trees in the Southern States and throughout tropical America (1), or near the gulf coast (2); sometimes collected as packing and stuffing material.

Collectotrichum bromeliacearum Birge, on stems. Tex. (2).

Volutella cylindrospora (Berk. & Curt.) Sacc., on stems. La. (1).

BUXACEAE

Buxus, box, boxwood

B. sempervirens L.

Evergreen shrub or small tree of the Mediterranean region, long cultivated for hedges, borders, and specimen plants; hardy in zone 6 and part of 5, cultivated from Cape Cod to Georgia, Mississippi, and Kentucky. Two varieties are generally distinguished: (1) var. *arborescens* L., tree box, "American" box; (2) var. *suffruticosa* L., dwarf box, "English" box; there are a number of minor horticultural forms, including variegated.

B. microphylla Sieb. & Zucc. (3)

Var. *japonica* (Muell. Arg.) Rehd. & Wils., Japanese box, and var. *koreana* Nakai, Korean box, are cultivated, the former more commonly in the South.

Armillaria mellea Vahl ex Fr., root rot. N.J.

Colletotrichum sp., leaf cast (?secondary). Md. (1,2).

Fomes igniarius (L. ex Fr.) Kickx, heart rot. Va. (1).

Fusarium buxicola Sacc. (=*Nectria desmazierii* Becc. & de N.), on branches, ?canker. Ala., Md., Pa. (1,2).

F. lateritium Nees ex Fr., on twigs and leaves, ?dieback or secondary. Md., S.C., Va. (1,2). *Fusarium* sp., commonly found on moribund or dead leaves of *Buxus*, is probably usually this or the preceding.

F. oxysporum Schlecht. emend Snyd. & Hans., root rot (?secondary). Md. (1).

F. roseum Lk. emend Snyd. & Hans., on twigs and leaves. Md. (1).

F. solani (Mart.) Appel & Wr., root rot (?secondary). Md. (1).

Ganoderma lucidum (Leyss. ex Fr.) Karst., white trunk rot. Va. (1).

Hyponectria buxi (DC. ex Fr.) Sacc., blight, leaf cast. Reported under this name only in N.Y. (2), but *Laestadia buxi* (Fckl.) Sacc., reported in Mass., Md., Miss., N.Y., is probably this and its distribution is general, especially on (2). *Verticillium buxi* is commonly associated.

Macrophoma candollei (Berk. & Br.) Berl. & Vogl. on moribund leaves. General, especially on (2), following freezing, sunscald, and other injuries. Some reports of *Phoma, Diplodia,* and *Sphaeropsis* belong here; also referred to *Ludwigiella candollei* (Berk. & Br.) Petr.

Nectria spp.: *N. cinnabarina* Tode ex Fr., is reported on twigs in Ala. For *N. desmazierii* see *Fusarium buxicola*. SEE ALSO *Hyponectria* and *Pseudonectria*.

Nectriella rousseliana (Mont.) Sacc.: SEE *Pseudonectria rousseliana*.

Penicillium roseum Lk., on moribund leaves. S.C. On this host probably refers to *Volutella buxi* and/or *Verticillium buxi*.

Phoma conidiogena Schnegg, leaf-tip blight. Md., N.J., N.Y. (1,2); Okla. (1).

Phomopsis stictica (Berk. & Br.) Trav. (probably *Diaporthe eres* Nits.), on twigs and branches. Md. (1,2).

Phyllosticta auerswaldii Allesch., leaf spot. Mass., Md., N.J., N.Y., Pa., Va., Wash. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Phytophthora parasitica Dast., root rot. Md. (1,2).
Poria punctata Fr., heart rot. Va. (2).
Pratylenchus pratensis (De Man) Filip., meadow nematode, associated with root necrosis and a factor in leaf-bronzing and dieback. N.Y. to Ala. and Tex., especially (2).
Pseudonectria rousseliana (Mont.) Seaver, on leaves. N.Y. Reputed ascigerous stage of *Volutella buxi*, general on moribund leaves, twigs, and branches. (1,2).
Pythium sp., root rot. Md., Mass. (2).
Rhizoctonia solani Kuehn, secondary rot rot. Cosmopolitan following injury by meadow nematodes and other causes.
Rotylenchus sp., on roots. Mass. (2).
Verticillium buxi (Lk.) Auers. & Fleischhack, on moribund leaves, twigs, and roots. Cosmopolitan. Often associated with *Hyponectria buxi*, but connection not confirmed.
Volutella buxi (DC. ex Fr.) Berk. & Br., on leaves, twigs, and branches, associated with canker and dieback. General (1,2). Reputed conidial stage of *Pseudonectria rousseliana* but connection not confirmed. Also referred to *Chaetodochium buxi* (DC.) Hoehn.
VARIEGATION, ?MOSAIC — cause unknown, distinct from marginal variegation in horticultural forms of box. Md., N.Y., Va. (1,2).

Pachysandra

(1) *P. procumbens*, Michx., Allegany pachysandra. Range 25,27,28,29,30.
(2) *P. terminalis* Sieb. & Zucc., Japanese spurge.

Native of Japan, cultivated in zone 5. Procumbent evergreen herbs (1) occasionally or (2) commonly grown for ground cover and ornament.

Gloeosporium sp. (*?Glomerella cingulata* (Ston.) Spauld. & Schrenk), leaf spot. Va. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophoma pachysandrae Hutchinson, on leaves. Va. (2).
Meloidogyne sp., root knot nematodes. (1).
Phyllosticta pachysandrae Dearn. & House, leaf spot. N.Y., Pa., Va. (1,2); N.C. (2).
Pseudonectria pachysandricola B.O.Dodge, dieback, stem canker. Conn., Del., N.J., N.Y., Pa. (2).
Rhizoctonia sp., stem rot (?secondary). N.J. (2).
Septoria pachysandrae Dearn., leaf spot. Fla., Tenn. (1).
Sphaeropsis sp., tip blight (?secondary). N.J. (2).
Volutella pachysandrae Hutch., on leaves. Va. (2).
V. pachysandricola B.O.Dodge: SEE *Pseudonectria pachysandricola*.

CACTACEAE

Carnegiea

C. gigantea (Engelm.) Britton & Rose (*Cereus gigantea* Engelm.), sahuaro.

Columnar or dendriform cactus of great size occurring in Arizona and southeastern California; a distinctive feature of the desert landscape, sometimes planted for novelty.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Ariz.
Erwinia carnegieana Standring, bacterial blight. Ariz.
Hendersonia cerei Pk., on cortex. Ariz.
Poria carnegieae Baxter, dry rot. Ariz.

Cereus

Cereus spp.

A diverse assemblage of small to large, columnar or cylindrical cacti, now distributed in various genera, which together constitute the largest tribe of the family; also a genus of this tribe but here used in the broader sense. Many are endemic in the deserts of the Southwestern States; some are cultivated for the showy, often nocturnal flowers.

Aspergillus alliaceus Thom & Church, stem and branch rot. Tex.
Botrytis cinerea Pers. ex Fr., gray-mold rot. Occasional under damp conditions in indoor culture.
Colletotrichum cerei Earle (*?C. gloeosporioides* Penz.), on cladodes. Fla. (on *Hylocereus undatus*).
Erwinia carotovora (L.R.Jones) Holland, bacterial rot. Tex.
Fusarium oxysporum Schlecht., root and stem rot. Ariz., Calif. (on *Lophocereus schottii*); Miss., Tex.
Gloeosporium lunatum Ell. & Ev.: SEE *Mycosphaerella opuntiae*.
Helminthosporium sp. (*?H. cactivorum* Petr.), stem rot. Tex. (on *Echinocereus chloranthus*).
Hendersonia opuntiae Ell. & Ev., scorch, scald (?secondary). Tex.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. On *Hylocereus undatus* and others.
Mycosphaerella opuntiae (Ell. & Ev.) Dearn., anthracnose. Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Poria sp. (*?P. sinuosa* Fr.), dry rot. Calif.
Septoria cacticola P.Henn., stem spot. Tex. (on *Acanthocereus pentagonus*).
Stevensea wrightii (Berk. & Curt.) Trott., black spot. Tex.
CORKINESS, "GLASSINESS," SCAB. See these headings under *Opuntia*.

Echinocactus

Echinocactus spp., barrel, star, and sea-urchin cacti.

Small to large, mostly cylindrical cacti of the Southwestern deserts; some yield palatable juice which has been used in confectionery, many are grown for novelty.

Aspergillus alliaceus Thom & Church, stem rot. Tex.
Diplotheca sp. (*?D. tunae* (Spreng.) Starb.), black spot. Tex.
Hendersonia opuntiae Ell. & Ev., scald. Tex.
Mycosphaerella opuntiae (Ell. & Ev.) Dearn., anthracnose. Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Epiphyllum

Epiphyllum (*Phyllocactus*) spp., crab cactus;

also *Schlumbergera truncata,* Christmas cactus.

Segmented cacti with mostly flat or angular cladodes, chiefly of Central or South America, with many horticultural derivatives; grown for showy, often nocturnal flowers.

Colletotrichum phyllocacti Ell. & Ev., on cortex. Ala.

CORKINESS, "GLASSINESS," SCAB. See these headings under *Opuntia.*

Mammillaria

Mammillaria spp., pincushion cactus, fishhook cactus.

Mostly small compact cacti, endemic in the Southwestern deserts; collected or grown for novelty.

Gloeosporium cactorum Ston., zonate spot.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Tex.

Mycosphaerella opuntiae (Ell. & Ev.) Dearn., anthracnose. Tex.

Phoma mamillariae Ell. & Ev., on spines. Mont.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Opuntia, pricklypear, tuna

(1) *O. compressa* MacBride
(2) *O. dillenii* (Ker-Gawl.) Haw.
(3) *O. engelmannii* Salm-Dyck ex Engelm.
(4) *O. ficus-indica* Mill.
(5) *O. lindheimeri* Engelm.
(6) *O. polycantha* Haw.
(7) Other species.

Numerous, mostly low cacti with segmented flat cladodes ("pads"), some round-stemmed and dendriform, occurring commonly on the arid plains of the Southwest, also near the coast in the Gulf and Eastern States, sometimes in the Central and Plains States; many introduced into cultivation from Central and South America. Some are grown for novelty and showy flowers; the relatively spineless types furnish natural forage or are cultivated; several are troublesome weeds on range lands.

Anthostomella cacti (Schw.) Sacc., on cortex. Calif. (3), N.J.

Aspergillus alliaceus Thom & Church, cladode rot. Tex.

Colletotrichum (*?C. dematium* (Fr.) Grove), on cladodes. N.Y., Tex., P.R. (7). SEE ALSO *Gloeosporium.*

Diplodia opuntiae Sacc., cladode rot. Md., Pa. (1), Kans., T.H. (7). SEE ALSO *Physalospora.*

Diplotheca tunae (Spreng.) Starb., black spot. P.R. (2).

Erwinia aroideae (Town.) Holland, bacterial rot. Fla., Miss., Okla., Tex. (7).

Gloeosporium cactorum Ston., ? zonate spot. Fla., Miss. (7); P.R. (2).

G. lunatum Ell. & Ev., anthracnose. Ala., Fla., Tex., P.R. (1,2,4,5). Probably the conidial stage of *Mycosphaerella opuntiae.*

G. opuntiae Ell. & Ev. (*?Glomerella cingulata* (Ston.) Spauld. & Schrenk), on cladodes. Miss., Mo., N.J. (7).

Hendersonia opuntiae Ell. & Ev., "sunscald," scorch (?secondary). N.J. (1), Ala. (4), Tex. (5), Mont. (6), Kans., Tex. (7).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Hyponectria cacti (Ell. & Ev.) Seaver, on cortex. Ala. (4).

Lembosia cactorum Tracy & Earle, black mildew. Fla. (1).

Leptosphaeria opuntiae Dodge, on cortex. Ala. (4), Tex. (5).

Macrophoma opuntiicola (Speg.) Sacc. & Syd., cladode spot. T.H. (7).

Meloidogyne sp., root knot nematodes. Miss., Oreg. (7).

Mycosphaerella opuntiae (Ell. & Ev.) Dearn., anthracnose, black rot. Fla. (1,2), N.Y. (1), Tex. (5), P.R. (2), Ala., La., S.C. (7).

Perisporium wrightii Berk. & Curt.: SEE *Stevensea wrightii.*

Phoma sp. (*?Phyllosticta cacti*), cladode rot. Okla. (1).

Phyllosticta cacti (Berk.) Archer, cladode spot. N. Mex. (7).

P. concava Seaver (=*P. cacti* ?), dry rot, brown spot. Mo., N.J., Okla., Tex. (7).

Physalospora obtusa (Schw.) Cke., black rot. N.Y. (1).

P. rhodina (Berk. & Curt.) Cke. Fla. (1).

Phytophthora parasitica Dast., stem rot. N.Y., P.R. (7).

Pythium debaryanum Hesse, stem rot. Calif. (7).

Sclerotium bataticola Taub., charcoal rot. Tex. (7).

Septoria fici-indicae Vogl., cladode spot. P.R. (2), Tex. (7).

Sphaeropsis opuntiae Fairm.: SEE *Physalospora obtusa.*

Stevensea wrightii (Berk. & Curt.) Trott., black spot. Fla. (1,7), P.R. (2), Tex. (3,5,7).

Teichospora mammoides Ell. & Ev. var. *opuntiae* Dearn. & Barth., on cortex. Calif. (7).

T. opuntiae Ell. & Ev.—Colo. (7).

Tretopileus opuntiae Dodge, on cladodes. Fla. (7).

Vermicularia cacti (Schw.) Starb.: SEE *Colletotrichum.*

MOSAIC—suspected virus. Md. (7).

"GLASSINESS"—physiological, perhaps a form of oedema and caused by water suffusion. Occasional in greenhouse or indoor culture.

DRY ROT—in part parasitic (*Mycosphaerella, Phyllosticta, Physalospora*); in part physiological, chiefly influenced by soil moisture. Occasional in greenhouse culture; also reported in natural stands in N. Mex. and Tex.

SCAB, CORKINESS—cause unknown, perhaps a form of oedema. Occasional in indoor culture, attributed to overwatering and deficient drainage.

CALYCANTHACEAE

Calycanthus

(1) *C. fertilis* Walt., mountain-spicewood. Range 27,28,29.
(2) *C. floridus* L., Carolina allspice. Range 29,30.
(3) *C. occidentalis* Hook. & Arn., California sweetshrub. Range 4.

Deciduous flowering shrubs grown for ornament: (1) hardy in zone 5, (2) in zone 4, (3) in zone 6.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Miss., N.Y. (2).
Botryosphaeria calycanthi (Schw.) Sacc. (*?B. ribis* (Tode ex Fr.) Gross. & Dug.), on twigs, ?canker. N.C., Va. (2).
Cytospora laxa Berk. & Curt., on twigs. Md. (2).
Nectria cinnabarina Tode ex Fr., on twigs. Md. (2).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Calif. (3).
Physalospora obtusa (Schw.) Cke., on branches. Ga., N.Y., Va. (2).

CAMPANULACEAE

Campanula

(1) *C. americana* L., American bellflower.
(2) *C. carpatica* Jacq., tussock bellflower.
(3) *C. persicifolia* L., willow bellflower.
(4) *C. petiolata* DC. (*C. rotundifolia* of Amer. auths.), harebell.
(5) Other species.

Biennial or perennial herbs: (2) and (3) of Europe, cultivated for ornament; (1) and (4) endemic in the United States, sometimes grown in wild gardens.

Aecidium campanulastri G.W.Wils. (O,I), rust. Iowa, Minn. (1).
Ascochyta bohemica Kab. & Bub., leaf spot. Wis. (5).
Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska (5).
Cercoseptoria minuta J.J.Davis, leaf spot. Wis. (5).
Coleosporium campanulae (Pers.) Lév. (II,III), rust. N.Y. to Miss., Mo., and Wis. (1); Calif. (3); Conn. to Ky. and Wis. (5), frequently also on *C. rapunculoides* L. O and I on *Pinus resinosa* and *P. rigida*.
Erysiphe cichoracearum DC., powdery mildew. Pa. (5).
Fusarium sp., root rot. N.J. (1), N.Y. (5).
Mycosphaerella campanulae (Ell. & Kell.) Jacz., on stems. Ohio (1).
Phlyctaena campanulae Clem., on stems. Colo. (4).
Phoma ?gentianae Kuehn, on stems. Tex. (4).
Phyllosticta alliariifoliae Allesch., leaf spot. N.J., N.Y. (5).
Puccinia campanulae Carm. (III), rust. Mont., N.Y. (4); Calif., Oreg., Wash. (5).
Ramularia macrospora Fres., leaf spot. Alaska (5).
Rhizoctonia solani Kuehn, root rot. Ill. (5).
Sclerotinia sclerotiorum (Lib.) dBy., stem rot. Md. (3).
Sclerotium rolfsii Sacc., southern blight. Ill. (2,3,5).
Septoria campanulae (Lév.) Sacc., leaf spot. Ill., Iowa, Kans., Miss., Mo. (1); Wis. (1,5).

Campanula medium L., Canterbury-bells.

Hardy biennial of Europe, cultivated for ornament.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md.
Rhizoctonia solani Kuehn, root and stem rot. Conn., Tex.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Wash.
Sclerotium rolfsii Sacc., southern blight. Ill., N.J.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif.
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Pa.

Platycodon

P. grandiflorum DC., balloonflower.

Hardy perennial of Europe, cultivated for ornament.

Colletotrichum sp., on stems. Conn.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Phytophthora sp. (*?P. cactorum* (Leb. & Cohn) Schroet.), blight. Minn.
Rhizoctonia solani Kuehn, root and stem rot. Conn., Pa.

Specularia, venus-lookingglass

(1) *S. biflora* (R. & P.) Fisch. & Mey.
(2) *S. leptocarpa* (Nutt.) A.Gray
(3) *S. perfoliata* (L.) A.DC.
(4) Other species.

Annual herbs of plains and dry woodlands; (1) mostly in Southern States, (2) Western States, (3) widely distributed; sometimes grown in wild gardens.

Cercospora speculariae Ell. & Langl., leaf spot. La. (4).
Coleosporium campanulae (Pers.) Lév. (II,III), rust. N.C., Pa. (3).
Cuscuta sp., dodder. Tex. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Septoria speculariae Berk. & Curt., leaf spot. Va. (1); Kans. (2); Pa. to Ala., Tex., and Wis. (3); Ill., La., Tex. (4).
S. specularina Sacc. S.C. (4).
Synchytrium sp., leaf gall. Tex. (3).
Ustilago speculariae Stevenson, seed smut. Okla. (3).

CANELLACEAE

Canella

C. winterana (L.) Gaertn., wild-cinnamon.

Small tree of the Caribbean region; the bark is used medicinally and for flavoring.

Meliola thouiniae Earle, black mildew. P.R.
Scolecopeltis portoricensis Speg., on leaves. P.R.
Triposporium stelligerum Speg., on leaves. P.R.

CANNACEAE

Canna

(1) *C. edulis* Ker-Gawl, edible canna.
(2) *C. flaccida* Salisb.
(3) *C. glauca* L.
(4) *C. indica* L., Indian shot.

Tuberous or rhizomatous perennial herbs of tropical America: (1) is cultivated for edible

tubers, the others for ornament; useful to wildlife.

Actinomyces sp., on rootstocks, ?scab. Del.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophoma subconica Ell. & Ev., on stems. La. (?3).
Meloidogyne sp., root knot nematodes. T.H. (1).
Myrmaecium cannae Dearn. & Barth., on leaves. P.R. (3).
Phoma sp., on stems. Ala. (3).
Physalospora obtusa (Schw.) Cke., on stems. Ala. (3,4).
Puccinia cannae (Wint.) P.Henn. (II,III), rust. Fla. (1,2,3); C.Z., P.R. (1,3). O and I unknown.
Rotylenchus similis (Cobb) Filip., root nematode. T.H. (1).
MOSAIC—unidentified virus. P.R., T.H (1); Md. (3).

Canna generalis Bailey, garden canna.

Cultigen derived from *C. iridiflora* Ruiz. & Pav., *C. warscewiczii* Dietr., *C. flaccida*, and other species of tropical America widely cultivated for ornamental flowers and foliage.

Alternaria sp., leaf spot (?secondary). Mich., S.C., Tex.
Fusarium sp., rhizome rot. Minn., Mo., Pa.
Pseudomonas cannae (Bryan) Stapp, bacterial bud rot. Colo., Conn., Ill., Iowa, Md., Miss., Nebr., N.C., N.J., Ohio, Okla.
Puccinia cannae (Wint.) P. Henn. (II,III), rust. Fla., Ohio, Tex., P.R.
Sclerotium rolfsii Sacc., southern blight. Tex.
MOSAIC—unidentified virus. Del., Md., Mich., N.Y., P.R.

CAPPARIDACEAE

Capparis, caper

(1) *C. jamaicensis* Jacq., Jamaica caper.
(2) Other species.

Tropical shrubs grown for ornament or sometimes for culinary use.

Albugo candida (Pers. ex Chev.) Kuntze, white blister. T.H. (2).
Asterina lepidigenoides Ell. & Ev., black spot. Fla. (1).
A. radians Ell.—Fla. (2).

Cleome, spiderflower

(1) *C. lutea* Hook
(2) *C. serrulata* Pursh
(3) *C. spinosa* L.
(4) Other species.

Annual herbs: (1) and (2) on prairies and plains in the Western and Central States; (3) originally of tropical America, widely cultivated for ornament and occasionally escaped in the Eastern and Southern States. All are useful honey plants.

Cercospora cleomis Ell. & Halst., leaf spot. Mich. (2), N.J. (3).
C. conspicua Earle—Okla. (1,2), P.R. (3,4).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Heterosporium hybridum Ell. & Ev., leaf spot. Iowa, Mont. (2).
Meloidogyne sp., root knot nematodes. T.H. (4).
?Peronospora parasitica Pers. ex Fr., downy mildew. La. (3).
Puccinia aristidae Tracy (O,I), rust. Ariz. (1); Ariz., Colo., Ind., Mont., Nebr., N. Mex. (2); Ind. (3); Colo., Del. (4). II and III on *Aristida* and *Distichlis* spp.

CAPRIFOLIACEAE

Abelia

(1) *A. chinense* R. Br., Chinese abelia.
(2) *A. grandiflora* (André) Rehd., glossy abelia.

Flowering shrubs: (1) deciduous, (2) half evergreen; (1) of eastern China, cultivated, zone 7; (2) of hybrid origin (*A. chinense* × *A. uniflora*), cultivated, zone 5.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif., Miss., Tex. (2).
Oidium sp., powdery mildew. Tex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Pythium sp., rootlet rot. Tex. (2).
Rhizoctonia solani Kuehn, root rot. Tex. (2).
CHLOROSIS—mineral deficiency attributed to soil alkalinity. Tex. (2).

Diervilla, bush-honeysuckle

(1) *D. lonicera* Mill. Range 23,24,26,27.
(2) Other species.

American deciduous shrubs, rarely grown for ornament. The cultivated species sometimes referred to *Diervilla* are placed in *Weigela* (q.v.). Useful to wildlife.

Cercospora diervillae Ell. & Ev. (a nomen nudum, probably = *C. weigelae* Ell. & Ev.), leaf spot. Maine (1), Tex. (2).
Godronia turbinata (Schw.) Farl., on twigs. Maine, Pa. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes (2).
Microdiplodia diervillae Fairm., on twigs. N.Y. (1).
Microsphaera alni DC. ex Wint., powdery mildew. N.J., Wash. (2).
Phyllosticta diervillae J.J.Davis, leaf spot. Wis. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Ramularia diervillae Pk., leaf spot. Maine, N.H., N.Y., Wis. (1).
Septoria diervillae Ell. & Ev., leaf spot. Iowa, Mass., Minn., Wis. (1).
Sphaeropsis diervillae Fairm. (=*Physalospora obtusa* (Schw.) Cke.?), on twigs. N.Y. (1).

Kolkwitzia

K. amabilis Graebn., beauty-bush.

Deciduous shrub of China, cultivated for ornament, zone 5.

Cercospora kolkwitziae Ray, leaf spot. Ala., Okla.

Linnaea

L. borealis L. var. *americana* (Forbes) Rehder, twinflower.

Trailing evergreen herb of northern woodlands and mountain summits; used in rock gardens; useful to wildlife.

Godronia linnaeae Karst., on stems. Maine.
Halbaniella linnaeae Dearn., black mildew. N.Y.
Phyllachora wittrockii (Eriks.) Sacc., tar spot. Mich., Mont., N.H., N.Y., Alaska.
Septoria breviuscula Sacc., leaf spot. N.Y.
Venturia dickiei (Berk. & Br.) Ces. & De N., leaf spot. Idaho, Mich., Mont., N. Mex., N.Y., Oreg., Wash., Wis.

Lonicera, honeysuckle

I. Subgenus *Chamaecerasus*, Native Species

(1) *Lonicera canadensis* Marsh., American fly-honeysuckle. Range 23,24,26,27.
(2) *L. involucrata* (Richards.) Banks ex Spreng., twinberry honeysuckle. Range 4,5,7,12,13,14,23,24,26.
(3) *L. oblongifolia* (Goldie) Hook., swamp fly-honeysuckle. Range 23,24,26,27.
(4) Other species.

Mostly deciduous shrubs, sometimes grown for ornament; useful to wildlife.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska (2).
Diaporthe eres Nits. (*D. cryptica* Nits.), on twigs. Del., N.J., Wis. (1); Calif. (2).
?Erysiphe polygoni DC., powdery mildew. Wyo. (2).
Eutypa lata (Pers. ex Fr.) Tul., on dead stems. Calif. (2).
Fomes ribis (Schum. ex Fr.) Cke., collar rot. Mont. (2).
Glomerularia lonicerae (Pk.) Dearn. & House: SEE *Herpobasidium deformans*.
Herpobasidium deformans Gould, leaf blight. Conn., Iowa, N.Y. (1); Wis. (1,3).
Kabatia lonicerae (Harkn.) Hoehn., leaf spot. Mich., N.Y., Pa., Wis. (1); Calif. (2,4); Colo. (2); N.Y., Wis. (3); Idaho, Wyo. (4). Also reported as *Leptothyrium periclymeni* (Desm.) Sacc., var. *americanum* Ell. & Ev., and *Marsonia lonicerae* Harkn.
K. mirabilis Bub.—Wyo. (2).
Libertella lonicerae Cke. & Harkn., on twigs. Calif. (2).
Microsphaera alni DC. ex Wint., powdery mildew. Ohio (1,3); Wyo. (2); Wis. (3); N.Y., Wyo. (4).
Phomopsis cryptica (Sacc.) Hoehn.: SEE *Diaporthe eres*.
Phyllosticta lonicerae West. (*?Ascochyta vulgaris* (Desm.) Kab. & Bub.), leaf spot. Okla. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).
Physalospora obtusa (Schw.) Cke., on twigs. Ala., N.J. (4).
Septoria xylostei Sacc. & Wint., leaf spot. Wis. (1,4).
Thyronectria lonicerae Seeler, on twigs. Colo., N. Dak. (2).

II. Subgenus *Chamaecerasus*, Introduced Species

(1) *Lonicera japonica* Thunb., especially var. *halliana* Nichols, Japanese honeysuckle. Naturalized throughout range 5,20,22,25, 27,28,29,30.
(2) *L. morrowii* A.Gray
(3) *L. tatarica* L., Tatarian honeysuckle.
(4) Other species.

Flowering shrubs (2,3) or woody vine (1), of Asia, locally to widely naturalized in the United States; cultivated for ornament (2,3) or ground cover (1); useful to wildlife.

Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Iowa (3).
A. tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Conn. (1,3), N.J. (3), Tex. (4).
Armillaria mellea Vahl ex Fr., root rot. N.J. (2).
Botrytis cinerea Pers. ex Fr., gray-mold blight. Conn., Alaska (3).
Cephaleuros virescens Kunze, green scurf. P.R. (1).
Cercospora varia Pk., leaf spot. Tex. (1,4).
Diaporthe eres Nits. (*D. cryptica* Nits., *Phomopsis cryptica* (Sacc.) Hoehn.), on dead branches. Del., N.J. (2); Okla. (4).
Diplodia sp., on stems. Va. (1). *D. lonicerae* Fckl.—Mo. (3).
Dothidea collecta (Schw.) Ell. & Ev., on stems. Ga., N.C., Va. (1).
Herpobasidium deformans Gould, leaf blight. Iowa (2, 3,4); Mich., N.Y., Wis. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Lasiobotrys lonicerae (Fr.) Kunze, black leaf spot. Oreg. (4).
Meloidogyne sp., root knot nematodes (4).
Microsphaera alni DC. ex Wint., powdery mildew. N.Y. (2); general (3); Okla., Tex. (4).
Mycosphaerella clymenia (Sacc.) Oud., leaf spot. Va. (1).
Pellicularia koleroga Cke., thread blight. La. (1).
Phoma mariae G.W.Clint., on stems, ?dieback. N.Y. (1); Mass. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,3,4).
Physalospora obtusa (Schw.) Cke., on stems, ?dieback. La., Miss. (1); Va. (4).
Rhabdospora lonicerae (Cke. & Ell.) Sacc., on stems. N.J. (1,4).
Solenia ochracea Hoffm. ex Fr., on bark. La. (1).
MOSAIC—(?variegation)—suspected virus. Md. (1).

III. Subgenus *Periclymenum*

(1) *Lonicera dioica* L., limber honeysuckle. Range 23,24,25,27.
(2) *L. flava* Sims, yellow honeysuckle. Range 25,27,28,29.
(3) *L. hispidula* (Lindl.) Torr. & Gray, pink honeysuckle. Range 2,3,4,5.
(4) *L. sempervirens* L., trumpet honeysuckle. Range 11,20,22,25,26,27,28,29,30.
(5) Other species.

Trailing or climbing woody vines; some are grown for ornament, especially (2) and (4); some are minor honey plants (3,5).

Cercospora sp., leaf spot. Mich. (1).
C. antipus Ell. & Holw.—Ill. (2); Iowa (2,4,5); Mont., Nebr., Tex., Wis. (5).
Diaporthe eres Nits. (*D. cryptica* Nits.), on stems. Del., Mich., N.J. (4).
Dothidea collecta (Schw.) Ell. & Ev., on stems. Ga. (2); Pa. (4).
Erysiphe polygoni DC., powdery mildew. Calif. (3).
Guignardia lonicerae Dearn. & Barth., on leaves. Calif. (3).
Lasiobotrys affinis Harkn., black leaf spot. Calif. (3).

Lasiobotrys lonicerae (Fr.) Kunze—Calif., Idaho, Mont. (5).
Microsphaera alni DC. ex Wint., powdery mildew. General (1,2,4,5).
Mycosphaerella clymenia (Sacc.) Oud., on leaves. Iowa (2).
Peltosphaeria vitrispora (Cke. & Harkn.) Berl., on leaves. Calif. (3).
Phoma xylostei Cke. & Harkn., on stems. Calif. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).
Physalospora obtusa (Schw.) Cke., on stems. Ga. (4).
Puccinia festucae (DC.) Plowr. (O,I), rust. Ill., Iowa (2,5). II and III on *Festuca* spp. in Europe and Canada.
Rosellinia aquila (Fr.) de N., on roots, ?rot. Ala. (2).
Septoria xylostei Sacc. & Wint., leaf spot. Mont., Wis. (5).
Systremma lonicerae (Cke.) Th. & Syd., on stems. Pa. (4).

Sambucus, elder

I. Native Species, Eastern and Central States

(1) *Sambucus canadensis* L., American elder. Range 15,16,17,18,20,21,22,23,24,25,26,27, 28,29,30.
(2) *S. pubens* Michx. (*S. racemosa* Amer. auths., not L.), scarlet elder. Range 21,22, 23,24,26,27,28.
(3) Other species.

Large shrubs, cultivated for ornament and (1) also for edible fruit; important food plants of wildlife.

Ascochyta wisconsina J.J.Davis, leaf spot. N.Y. (1); Wis. (1,2).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., especially the var. *chromogena* Shear et al., on branches, ? canker, dieback. Fla., Ga. (1).
Cercospora catenospora Atk., leaf spot. Ala., Kans., Miss., N.C., Tex. (1).
C. depazeoides (Desm.) Sacc.—General (1).
C. lateritia Ell. & Halst.—Iowa (1,2); Kans. (1).
Corticium microsclerotia Weber (=*Pellicularia filamentosa* (Pat.) Rogers), web blight. Fla. (3).
Cryptospora pulviniceps (Pk.) Sacc., on branches. N.Y. (1).
Cytospora spp., on twigs and branches, ?canker: *C. chrysosperma* Pers. ex Fr. (=*Valsa sordida* Nits.) —Kans., N.J., N.Y. (1); *C. sambucicola* Tehon & Stout — Ill. (1); *C. sambucina* Ell. & Barth. — Kans., N.Y. (1).
Diaporthe megalospora Ell. & Ev., on branches. Ga., Mass., Mich., N.Y. (1).
D. sociabilis Nits. var. *sambuci* (Ell. & Ev.) Wehm.— Ga., La., Mich. (1).
Diatrype sambucivora (Schw.) Cke., on branches. Pa., Va. (1).
Diplodia spp., on twigs and branches: *D. sambucina* Sacc.—Mich., N.J., N.Y. (1); *D. sambuci* Tehon & Daniels—Ill. (1). SEE ALSO *Physalospora*.
Dothiorella macrospora (Berk. & Curt.) Sacc., on branches. Mich., Pa. (1).
Eutypella spp., on dead branches and twigs: ***E. glandulosa*** (Cke.) Ell. & Ev.—Md. (1); ***E. ludibunda*** Sacc.—Md., N.Y. (1); ***E. microcarpa*** Ell. & Ev.— Ga. (1).
Glocosporium tineum Sacc., leaf spot. Miss., Tex. (1).
Heterosporium interseminatum (Berk. & Rav.) Atk., on dead twigs. Ala., Iowa, N.J., Ohio, W. Va. (3).
Leptothyrium pomi (Mont. & Fr.) Sacc., on twigs. Va. (1).
Microdiplodia paupercula (Berk. & Br.) Dearn., on branches. N.Y. (1); Va. (2).
Microsphaera alni DC. ex Wint., and *M. grossulariae* (Wallr.) Lév., powdery mildew. Both species widespread or general, the latter more commonly reported on (1) and only this reported on (2).
Nectria cinnabarina Tode ex Fr., on twigs, ?canker, dieback. Maine to Ala., Tenn., and N. Dak. (1); Va. (2).
Pellicularia koleroga Cke., thread blight. La. (3).
Phomopsis sp., on twigs. Va. SEE ALSO *Diaporthe*.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Mich. (1).
Phyllosticta sp., leaf spot. N.Y., Pa. (1).
P. sambuci Desm.—Ind., Mo., N.Y., Wis., W. Va. (1).
P. sambucicola Kalchbr.—Ind. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Physalospora spp., on branches, ?canker, dieback. *P. abdita* (Berk. & Curt.) N.E.Stevens—Ala., N.Y. (1); *P. obtusa* (Schw.) Cke. — Ala., Va. (1); *P. rhodina* (Berk. & Curt.) Cke.—N.Y. (1).
Puccinia bolleyana Sacc. (O,I), rust. Maine to Fla., Tex., and Minn. (1); Del., Ind., Md., Mich. (2). II and III on *Carex* spp.
Ramularia sambucina Sacc., leaf spot. Mo., W. Va. (1); N.Y. (1,2); Pa., Wis. (2).
Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot. Tex. (1).
Septoria sambucina Pk., leaf spot. N.Y. to Fla., Tex., and Wis. (1); Wis. (2).
Sphaceloma sp., spot anthracnose. La. (1).
Sphaeropsis sambuci Pk., on branches, ?canker. Ind., Mich., N.Y., N. Dak. (1).
S. sambucina (Cke.) Sacc.—Ind., Kans., N. Dak., N.Y. (1).
Sphaerotheca humuli (DC.) Burr., on branches. Mass. (1).
Sphaerulina sambucina Pk., on branches. N.Y. (1).
Synchytrium sambuci M.T.Cook, leaf gall. La. (1).
Systremma natans Tode ex Th. & Syd., on twigs. N.Y. (1).
Thyridaria sambucina (Pk.) Wehm., on branches. N.Y. (1).
Xylaria sp., root rot. Tex. (1).
MOSAIC—suspected virus. Fla., Pa. (1).

II. Native Species, Pacific Coast and Western States

(1) *Sambucus caerulea* Raf., blueberry elder. Range 1,2,4,5,6,7,8,9,11,12,13,14.
(2) *S. callicarpa* Greene, Pacific elder. Range 1,2,4.
(3) *S. melanocarpa* Gray, blackbead elder. Range 4,9,10,12,13,14.
(4) Other species.

Large shrubs (2,3) to small trees (1); important wildlife-food plants; also grown for ornament, especially (1), zone 5.

Cercosporella prolificans Ell. & Holw., leaf spot. Calif., Oreg. (1); N. Mex. (3).
Coniothyrium sambuci Earle, on twigs. Colo. (4).
Cryptodiaporthe calosphaerioides (Ell. & Ev.) Wehm., on branches. Alaska (2).
Cytospora chrysosperma Pers. ex Fr., on twigs. Wash. (1).
Diaporthe sociabilis Nits. var. *sambuci* (Ell. & Ev.) Wehm., on branches. Calif., Wash. (1,2); Alaska (2); Idaho (3).
Diplodina deformis (Karst.) Sacc., on branches. Wash. (3).
Eutypella virescens Wehm., on branches. Oreg. (2).

Exosporium pedunculatum (Ell. & Ev.) W.B.Cooke, on dead twigs. Calif., Idaho, Wash. (4).
E. sambuci Tracy & Earle—Colo. (3).
Fomes igniarius (L. ex Fr.) Kickx, heart rot. Idaho (1).
Hymenochaete agglutinans Ell., trunk canker. Wyo. (2).
Leptosphaeria sambuci Fautr., on dead branches. Oreg. (1).
L. sambucina Ell. & Ev.—Colo. (3).
Mycosphaerella sp. N. Mex. (3).
Myxosporium sambuci Dearn., on twigs. Wash. (4).
Nectria cinnabarina Tode ex Fr., on twigs, ?canker. Idaho, Wash. (1); Alaska (2); Mont. (3).
N. coccinea Pers. ex Fr.—Idaho (1); Wash. (2).
Nectriella sambuci (Hoehn.) Weese, on twigs. Calif. (2).
Phomopsis sambucina (Sacc.) Trav.: SEE *Diaporthe sociabilis* var. *sambuci*.
Phyllosticta sambuci Desm., leaf spot. Mont. (1).
Polyporus spp., wood rot, chiefly of dead trunks and branches: *P. caesius* (Schw.) Fr.—Calif., Oreg. (1); *P. farlowii* Lloyd—Ariz., Calif. (1); *P. planellus* (Murr.) Overh.—Idaho, Wash. (1); *P. versicolor* L. ex Fr.—Wash. (1).
Ramularia glauca Ell. & Ev., leaf spot. Calif., Wash. (1); Colo. (4).
R. sambucina Sacc.—Wash. (1), N. Mex. (4).
Septoria sambucina Pk., leaf spot. Calif., Oreg., Wash. (1,2).
Sphaeropsis sambucina (Cke.) Sacc. (*?Haplosporella alpina* Ell. & Ev.), on branches. Calif., Mont. (1); Colo. (3); Nev. (4).
Thyridaria sambucina (Pk.) Wehm., on branches. Wash. (1), Colo. (4).

III. Introduced Species

(1) *Sambucus nigra* L., European elder. Large shrub or small tree, grown for ornament and edible fruit, zone 5.
(2) Other species.

Ascochyta sambuci Sacc., leaf spot. Alaska (1).
Botryosphaeria ribis Tode ex Fr., on branches, ?canker. Ga. (1).
Cercospora depazeoides (Desm.) Sacc., leaf spot. Iowa, Maine (1).
C. lateritia Ell. & Halst.—Iowa (1).
Cytospora sp., twig canker. N.J. (2).
Phyllosticta sambuci Desm., leaf spot. N.J. (1).
Puccinia bolleyana Sacc. (O,I), rust. Mass. (1).
Sphaeropsis sambucina (Cke.) Sacc., dieback. Calif. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Md. (2).

Symphoricarpos

(1) *Symphoricarpos albus* (L.) Blake, including var. *laevigatus* (Fern.) Blake, common snowberry. Range nearly throughout the United States except the Southeastern and Gulf States; cultivated, zone 3.
(2) *S. oreophilus* A.Gray, mountain snowberry. Range 4,9,10,11,12,13,14; cultivated, zone 5.
(3) *S. rotundifolius* A.Gray, round-leaf snowberry. Range 4,9,10,11,12,13,14; cultivated, zone 6.

Deciduous shrubs, cultivated for ornamental berries, important food plants of wildlife, and also browsed by livestock.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Md. (1).
A. rhizogenes (Riker et al.) Conn, hairy root. Iowa.
Alternaria sp., brown rot of berries. Colo., Conn., Ill., Mass., N.Y., Ohio (1). This has been referred to *A. solani* (Ell. & Martin) Sor. f. *symphoricarpi* W.H.Davis, and also to *A. tenuis* Nees ex Cda.
Ascochyta symphoricarpophila Fairm., leaf spot. N.Y. (1).
Botrytis cinerea Pers. ex Fr., berry rot. Conn., Mass., N.Y. (1).
Cercospora symphoricarpi Ell. & Ev., leaf spot. Mont., Oreg., S. Dak., Alaska (1).
Cladosporium sp., berry rot (?secondary). Md., Va. (1).
Diaporthe spiculosa (Alb. & Schw.) Nits., on twigs. N.Y. (1).
Didymaria symphoricarpi Ell. & Ev., on leaves. Calif. (4).
Diplodia symphoricarpi Sacc., on twigs. Calif., N.Y. (1).
Fomes ribis (Schum. ex Fr.) Gill., collar rot. Mont. (1).
Gibberidea symphoricarpi Tracy & Earle, on branches. Colo. (2).
Gloeosporium spp., anthracnose, scab, black rot of berries. In part the conidial stage (also reported as *Colletotrichum* sp.) of *Glomerella cingulata*, but mostly *Sphaceloma*, q. v.
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose (black rot of berries, twig canker). Mass. to Va., Ill., and Wis. (1).
Haplosporella symphoricarpi Pk., on twigs. N.Y. (1).
Hymenochaete tabacina (Sow. ex Fr.) Lév., on dead branches. Idaho (1).
Karschia impressa Ell. & Ev., on branches. Colo. (2).
Lasiobotrys symphoricarpi Syd., black leaf spot. Colo., Utah (2); Wyo. (3). Also referred to *Rhizogene symphoricarpi* Syd.
Microsphaera diffusa Cke. & Pk. (*M. symphoricarpi* Howe), powdery mildew. General (*). Reports of *M. alni* are referred here.
Phoma baccicola Richon, on berries. Iowa (1).
Phyllosticta symphoricarpi West., leaf spot. N.Y., Wash. (1); N. Mex. (2).
Physalospora obtusa (Schw.) Cke., on twigs. N.J., N.Y. (1).
Podosphaera oxyacanthae DC. ex dBy., powdery mildew. Wash. (1).
Puccinia crandallii Pam. & Hume (O,I), rust. S. Dak. to Colo., Calif., and Wash. (1); Mont. to Colo., Calif., and Idaho (2); Mont., Utah, Wyo. (3). II and III on *Festuca* and *Poa* spp.
P. symphoricarpi Harkn. (III)—Mont. to Calif. and Alaska (1).
Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot. Tex. (1).
Rosellinia parasitica Ell. & Ev., on dead branches. Colo. (2), Utah (3).
Septoria spp., leaf spot: *S. oedospora* Clements—Colo. (2); *S. signalensis* Solheim—Wyo. (2); *S. symphoricarpi* Ell. & Ev.—N. Dak. to Colo., Calif., and Wash. (1).
Sphaceloma symphoricarpi Barrus & Horsfall, spot anthracnose, scab. Maine to Va., Ark., and Wis.; also Calif., Colo., Oreg. (1).
Valsa ambiens Pers. ex Fr., on dead twigs. Utah (3).

Symphoricarpos occidentalis Hook., wolfberry. Range 15,18,21,22,23,24; small thicket-forming shrub; a minor honey plant; useful to wildlife.

Camarosporium umbonatum Brenckle, on dead branches. N. Dak.

Cercospora symphoricarpi Ell. & Ev., leaf spot. Iowa, Kans., Mont., Nebr.
Cryptospora kansensis Ell. & Ev., on branches. Kans.
Dibotryon symphoricarpi (Rehm) Petr., black knot, twig canker. N. Dak. This has been confused with *Otthia* (*?Valsaria*) *symphoricarpi*, q.v.
Diplodia symphoricarpi Sacc., on twigs. Kans.
Dothichiza symphoricarpi Petr., on twigs. N. Dak.
Fomes ribis (Schum. ex Fr.) Gill., collar rot. Kans., N. Dak.
Microsphaera diffusa Cke. & Pk., powdery mildew. General.
Nectria coryli Fckl., on twigs, ?canker. N. Dak.
Otthia symphoricarpi Ell. & Ev., on branches. Mont., ?N. Dak. Also referred to *Valsaria symphoricarpi* (Ell. & Ev.) Th. & Syd. SEE ALSO *Dibotryon symphoricarpi.*
Pezizella dakotensis Rehm, on twigs. N. Dak.
Puccinia crandallii Pam. & Hume (O,I), rust. Colo., Mont., N. Dak., Wyo. II and III on *Festuca* and *Poa.*
P. symphoricarpi Harkn. (III)—Mont.
Rosellinia parasitica Ell. & Ev., on dead branches. Kans., Mont.
Septoria symphoricarpi Ell. & Ev., leaf spot. Iowa, Mont., N. Dak., Wash.
Thyronectria lonicerae Seeler, on branches. Colo., N. Dak.

Symphoricarpos orbiculatus Moench, coralberry.

Range 18, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30. Small thicket-forming shrub, cultivated, zone 2; useful in erosion control; useful to wildlife.

Alternaria sp., mold or rot of berries. N.J.
Cercospora symphoricarpi Ell. & Ev., leaf spot. Kans., Nebr., Tex.
Cryptospora kansensis Ell. & Ev., on twigs. Kans.
Microsphaera diffusa Cke. & Pk., powdery mildew. General.
Phomopsis sp., stem gall. Md.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia crandallii Pam. & Hume (O,I), rust. Kans., Mo., Okla.
Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot. Tex.

Triosteum, horsegentian

(1) *T. angustifolium* L.
(2) *T. aurantiacum* Bicknell
(3) *T. perfoliatum* L.

Perennial herbs of woodlands in the Northeastern and Central States and southward; (2) and sometimes (3) are grown in wild gardens; useful to wildlife.

Aecidium triostei Arth. (O,I), rust. Mo. (1).
Cercospora triostei Chupp & Greene, leaf spot. Wis.
Cladosporium triostei Pk., leaf spot. Ill., Iowa, Mo., Nebr., Wis., Va. (2,3).
Cylindrosporium triostei Kell. & Swing., leaf spot. Okla. (2); Kans., Wis. (2,3); Ill. (3).
Gnomonia triostei (Dearn. & House) Dearn., on stems. N.Y. (3).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Mich. (3).

Viburnum

I. Native Species

(1) *Viburnum acerifolium* L., maple-leaf viburnum. Range 23,24,25,26,27,28,29.
(2) *V. alnifolium* Marsh., hobble-bush. Range 23,24,26,27.
(3) *V. cassinoides* L., withe-rod. Range 23,24, 25,26,27,28,29.
(4) *V. dentatum* L., arrowwood. Range 22,23, 24,25,26,27.
(5) *V. lentago* L., nannyberry. Range 13,15, 18,21,22,23,24,25,26,27,28,29.
(6) *V. prunifolium* L., blackhaw. Range 20, 22,23,24,25,27,28,29,30.
(7) *V. trilobum* Marsh., cranberry-bush. Range 4,12,15,18,21,22,23,24,25,26,27.

Deciduous shrubs or sometimes small trees, sparingly cultivated, except (7) which is grown for ornament and edible fruit, but important food plants of wildlife.

Aecidium rubromaculans E.West (O,I), rust. Fla. (on *V. corymbosum* (Mill.) Rehd.).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches, ?canker. Va. (4).
Cercospora opuli (Fckl.) Hoehn., leaf spot. Iowa (7).
C. varia Pk., common on all species throughout their ranges, and generally reported under this name but may be a synonym of *C. opuli.*
Cladosporium sp., leaf mold. Miss., W. Va.
Coleosporium viburni Arth. (II,III), rust. Ill. (1); Md., Va., Wis. (4); Iowa, Mich., Wis. (5). O and I unknown.
Corticium galactinum (Fr.) Burt, root rot. Md. (4).
Cryptosporella lentaginis (Ell. & Ev.) Rehm, on twigs. Iowa (5).
Cuscuta compacta Juss., dodder. Fla. (7).
Dermea viburni Groves, on twigs. Mass., N.Y., Tenn., Vt. (3,5).
Diaporthe beckhausii Nits., on twigs. N.Y. (4).
D. opuli Wehm.—N.Y. (4).
D. viburni Dearn. & Bisby—Iowa (5), Ga.
Diplodia microspora Berk. & Curt., on branches. N.Y., Pa. (4).
Dothiorella peckiana Sacc., on twigs. N.Y. (2).
Fomes conchatus (Pers. ex Fr.) Gill., wood rot. Mo. (6).
Godronia viburnicola Seaver, on twigs. N.H. (3,4).
Helminthosporium beaumontii Sacc., leaf spot. Ala., Tex.
Hendersonia foliorum Fckl. var. *viburni* Sacc., leaf spot. Fla., Tex. (6).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Hymenochaete agglutinans Ell., ?collar rot, canker. Pa. (4).
Hysterographium lesquereuxii (Duby) Ell. & Ev., on twigs. Fla.
Macrophoma hyalina (Berk. & Curt.) Berl. & Vogl., on twigs. Pa. (4).
M. viburni Dearn. & House—N.Y. (4). SEE ALSO *Physalospora* and *Botryosphaeria.*
Meloidogyne sp., root knot nematodes. Calif., Md., Miss.
Micropeltis viburni Dearn. & House, on leaves. N.Y. (3).
Microsphaera alni DC. ex Wint., powdery mildew. General (*).
Monochaetia ?desmazieri Sacc., leaf spot. W. Va.
Pellicularia koleroga Cke., thread blight. N.C. (7).
Pezicula minuta Pk., on branches. Va. (2), N.Y.
Phomopsis sp., branch gall, dieback. N.J., N.Y.
Phyllosticta lantanoidis Pk., leaf spot. N.Y. (2,3,4).
P. tinea Sacc.—Maine, Vt. (2).
P. tineola Sacc.—Wis. (4).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (*).
Physalospora abdita (Berk. & Curt.) N.E.Stevens (*P. fusca* N.E.Stevens), on branches. S.C.
P. obtusa (Schw.) Cke.—Fla., Ga., Md., N.Y., S.C. (4,6).
P. rhodina (Berk. & Curt.) Cke.—Mass.
Plasmopara viburni Pk., downy mildew. Ala., Md., Mass., N.Y., W. Va. (1,4); Minn., Wis. (7). Author is Pk. ex J.J.Davis if based on oospores.
Pseudomonas viburni (Thornberry & H.W.Anderson) Stapp, bacterial spot. Ill. (4).
Puccinia linkii Klotzsch (III), rust. Idaho, Mich., Mont., N.H., Wash., Alaska, on *V. pauciflorum* Raf.
Ramularia viburni Ell. & Ev., leaf spot. Wis. (5), Tenn. (6).
Rhabdospora lantanoidis (Pk.) Jacz., on branches. N.Y. (2,3).
Rosellinia necatrix Prill., root rot. Calif.
Septobasidium rugulosum Couch, brown felt. Fla.
Septoria sp., leaf spot. Minn. (5).
Sphaeronema hystricinum Ell.: See *Dermea viburni.*
Sphaeropsis viburni Ell. & Dearn, *S. viburnidentati* Dearn. & House: See *Physalospora obtusa.*
Trametes sepium Berk., wood rot. Mo. (6).
Valsa ambiens Pers. ex Fr., on dead branches. N.Y. (4).
Verticillium albo-atrum Reinke & Berth., wilt. Oreg., Wash. (5).

II. Introduced Species, Mostly Deciduous Shrubs

(1) *Viburnum carlesii* Hemsl. Native of Korea; cultivated, zone 4.
(2) *V. lantana* L., wayfaring-tree. Native of Europe; cultivated, zone 3, and naturalized in eastern U.S.
(3) *V. macrocephalum* Fort., Chinese snowball. Native of China; cultivated, zone 6.
(4) *V. opulus* L., European cranberry-bush; including var. *roseum* L., common snowball. Native of Europe and Asia, cultivated, zone 3.
(5) *V. tomentosum* Thunb., especially var. *sterile* K. Koch, Japanese snowball. Native of China and Japan; cultivated, zone 4.
(6) Other species.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Pa., Wash. (4).
Botrytis cinerea Pers. ex Fr., gray-mold blight. Mass., Wash. (4).
Cercospora opuli (Fckl.) Hoehn., leaf spot. Iowa, Miss. (4).
C. tinea Sacc.—La. (6).
C. varia Pk.—N.Y. (1); Ill. (2); Okla. (4).
C. viburnicola Ray—Okla. (4).
Cladosporium herbarum Lk. ex Fr., leaf mold. Ohio, Pa. (1).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (5,6).
Corticium galactinum (Fr.) Burt, root rot. Md. (1).
C. stevensii Burt: See *Pellicularia koleroga.*
Diaporthe opuli Wehm., on branches. N. Dak. (4).
Eutypella ludibunda Sacc. and *E. stellulata* (Fr.) Sacc., on dead twigs. N.Y. (2).
Helminthosporium beaumontii Sacc., leaf spot. Ala., Tex. (4).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Macrophoma viburni Dearn. & House, on twigs. Md., N.Y. (4).
Meloidogyne sp., root knot nematodes. Md., Va. (6).
Microsphaera alni DC. ex Wint., powdery mildew. Tex., Wis. (4).
Pellicularia koleroga Cke., thread blight. Fla. (4).
Phomopsis sp., twig canker, dieback. Md., N.Y. (4,6).
Phyllosticta punctata Ell. & Dearn., leaf spot. Iowa, Wis. (4); Fla. (6).
P. tinea Sacc.—Md.
Plasmopara viburni Pk. (or Pk. ex J.J.Davis), downy mildew. N.J. (2); Md., Wis. (4).
Polyporus versicolor L. ex Fr., wood rot. Md. (2).
Pseudomonas viburni (Thornberry & H.W.Anderson) Stapp, bacterial leaf spot. Ill. (4,6); Iowa, N.J. (6).
Rhabdospora interrupta (Berk. & Curt.) Sacc., on twigs. Pa., Alaska (4).
R. lantanoidis (Pk.) Jacz.—N.Y. (2).
Sphaceloma viburni Jenkins & Bitanc., spot anthracnose. Wash. (4), Calif. (6).
Verticillium albo-atrum Reinke & Berth., wilt. Ill. (2), Ind. (5).

III. Introduced Species, Evergreen Shrubs or Small Trees

(1) *Viburnum davidii* Franch. Native of China; cultivated, zone 5.
(2) *V. rhytidophyllum* Hensl. Native of China; cultivated, zone 5.
(3) *V. tinus* L., laurestinus. Native of Mediterranean region; grown as a pot plant under glass or as a shrub or small tree in the open in the Far South.

Cephaleuros virescens Kunze, green scurf. Fla., La. (3).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (2).
Hendersonia tini Ell. & Langl., leaf spot. La. (3).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Leptosphaeria tini Ell. & Ev., leaf spot. La. (3).
Meloidogyne sp., root knot nematodes. Md. (1), Calif. (3).
Phyllosticta tinea Sacc., leaf spot. Md. (1).
Plasmopara viburni Pk., downy mildew. Ga. (3).
Verticillium albo-atrum Reinke & Berth., wilt. Oreg. (3).

Weigela

Weigela spp.

Deciduous shrubs of eastern Asia grown for ornament, zone 5 and 6. The garden forms are complex hybrids derived chiefly from *W. florida* (Sieb. & Zucc.) A. DC., *W. floribunda* (Sieb. & Zucc.) C. A. Mey., *W. coraeensis* Thunb., and *W. japonica* Thunb. Formerly included in *Diervilla;* often misspelled *Weigelia.* Names of fungi based on this misspelling are corrected herein.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Miss.
Cercospora weigelae Ell. & Ev., leaf spot. Md., Miss., N.J.
Diplodia weigelae Sacc., on twigs. N.Y.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif., Md., Miss., Tex.

Mycosphaerella weigelae Fairm., on leaves. Ga., Miss., N.Y.
Phoma weigelae Speg., twig blight. Wash.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pratylenchus pratensis (De Man) Filip., root nematode. Ky.
Ramularia diervillae Pk., leaf spot. Tenn.
STEM GALL—cause unknown, perhaps eriophyid mites. Md., Pa.

CARICACEAE

Carica

C. papaya L., papaya.

Tropical American tree, cultivated for edible fruit; commercial production chiefly in Hawaii and Puerto Rico, and to a limited extent in California, Florida, and Texas.

Alternaria sp. (*?A. tenuis* Nees ex Cda.), blossom-end rot. T.H., V.I.
Ascochyta caricae Pat., black spot of fruit, stem rot. P.R.
Asperisporium caricae (Speg.) Maubl., leaf spot. Fla., Tex., C.Z., P.R., V.I. Said to be the conidial stage of *Sphaerella caricae* Maub. (not *Mycosphaerella caricae* Syd.)
Asterina caricarum Rehm, black mildew. Fla.
Choanephora americana Moell., blossom and leaf spot. Fla.
Colletotrichum spp., fruit rot, petiole spot. Fla., Tex., Hawaii, P.R., V.I. In part *C. gloeosporioides* Penz. (=*Glomerella cingulata*); in part reported as *C. falcatum* Went (=*Physalospora tucumanensis*)—Tex., P.R.
Didymella sp., petiole spot. T.H.
Diplodia sp. (*?D. theobromae* (Pat.) Nowell), fruit rot. Tex., Guam.
Erysiphe ?cichoracearum DC., powdery mildew. Calif.
Fusarium sp. (*?F. diversisporum* Sherb. = *F. roseum* Lk. ex Snyd. & Hans.), root and stem rot. Calif., Tex., T.H.
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose (fruit, stem, and leaf spot). General.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla., Tex., T.H.
Mycosphaerella sp., target spot. Fla.
Oidium caricae Noack, powdery mildew. Fla., Tex., T.H.
Phyllosticta sp., leaf rot. T.H.
P. caricae-papayae Allesch., target spot. Fla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Phytophthora palmivora Butl., fruit rot, root rot. P.R.
P. parasitica Dast.—collar rot, fruit rot. T.H.
Pucciniopsis caricae Earle: SEE *Asperisporium caricae*.
Pythium aphanidermatum (Edson) Fitzp., root rot. Calif., Fla., T.H.
P. debaryanum Hesse, damping-off. Tex.
Rhizoctonia solani Kuehn, damping-off. T.H.
Sclerotium rolfsii Sacc., southern blight. Tex.
BUNCHY TOP—unidentified virus. P.R.
MOSAIC—unidentified virus. P.R.
RING SPOT (?MOSAIC)—unidentified virus. T.H.
WAIALUA DISEASE—unidentified virus. T.H.

CARYOPHYLLACEAE

Agrostemma

A. githago L., corncockle.

Annual herb of Europe, diffusely naturalized in the United States and a weed in grainfields; sometimes grown for ornament; useful to wildlife.

Fusarium sp. (*?F. culmorum* (W.G.Sm.) Sacc.), stem rot. Ind.
Gloeosporium sp., leaf spot. Ind.
Marssonina delastrei (De Lac.) Magn., leaf spot. Ill., Ind., Mich., Miss., Mo.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Septoria lychnidis Desm. var. *pusilla* Trail, leaf spot. N. Dak.

Arenaria, sandwort

(1) *A. congesta* Nutt.
(2) *A. fendleri* A.Gray
(3) *A. groenlandica* (Retz.) Spreng.
(4) *A. peploides* L.
(5) *A. sajanensis* Willd.
(6) *A. stricta* Michx.
(7) Other species.

Low, mostly perennial herbs (those listed), others annual, of sandy or rocky habitats, mostly northern or alpine. Several are grown in rock gardens (3,5,6); a few are minor forage plants (1,2,4); others are weeds.

Erysiphe polygoni DC., powdery mildew. Calif. (6).
Hendersonia tenella Schroet., leaf spot. Tex. (7).
Mycosphaerella stellarinearum (Rabh.) Johans., on leaves. Colo. (5).
M. tingens (Niessl) Larsen, on leaves. N. Mex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (7).
Puccinia arenariae (Schum.) Wint. (III), rust. Mont. (1); N.Y., Wis. (6); Calif., Fla., Tex. (7).
P. tardissima Garrett (II,III), rust. Colo., Utah, Wyo. (1); N. Mex. (2); Colo., Oreg., Tex., Utah, Wyo. (7).
Pyrenophora comata (Niessl) Sacc., on stems. Alaska (7).
P. phaeospora (Duby) Sacc., on stems. Wyo. (5).
Septoria sp., on leaves. N.J. (7).
S. ammodeniae Dearn., on leaves. Alaska (4).
Uromyces silenes (Schlecht.) Fckl. (O,I,II,III), rust. Colo., Utah (7).
Ustilago violacea (Pers.) Fckl., anther smut. Maine, N.H., N.Y., Vt. (3); Tex. (7).

Cerastium, mouse-eared chickweed

(1) *C. alpinum* L.
(2) *C. arvense* L. and its varieties.
(3) *C. nutans* Raf.
(4) *C. viscosum* L.
(5) *C. vulgatum* L.
(6) Other species.

Low perennial (1,2,5) or annual (3,4) herbs, endemic or widely naturalized in the United States; mostly weeds, but some are grown in

rock gardens, some furnish food for wildlife.

Isariopsis albo-rosella (Desm.) Sacc., leaf spot. Wis. (3); Mass., Wis. (4); Miss., N.H., N.Y., Pa., Wis. (5).

Melampsorella cerastii (Pers.) Schroet. (II,III), rust. Maine (1); Colo., Mont., N. Mex., S. Dak., Utah, Wash., Wyo., Alaska (2,6); Nebr., Oreg. (5). O and I on *Abies* and *Picea* spp.

Peronospora alsinearum Casp., downy mildew. Colo. (2); Ill., Iowa, Md., Wis. (3); Ala., Iowa, Miss., N.C. (4,5). Several segregates from this species have been reported as *P. conferta* (Unger) Gäum. in Alaska (5); *P. septentrionalis* Gäum. in Arctic North America; *P. atlantica* Gäum in Colo. (2).

Phoma herbarum West., on stems. Tex. (4,5).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4,5).

Pseudopeziza cerastiorum (Wallr.) Fckl., leaf spot. Oreg. (2).

Puccinia arenariae (Schum.) Wint. (III), rust. Colo., Mont. (6).

Rhizoctonia solani Kuehn, root and stem rot, brown patch. Maine to Md., Ill., and Minn. (5); Tex. (4,5).

Sclerotium rolfsii Sacc., southern blight. Tex. (4,5).

Septoria cerastii Rob. & Desm., leaf spot. Ala., Ky., Miss. (2); Ala., Ill., Ind., Ky., Miss., Mo., N.J., Tex. (4,5); Idaho, Wis. (6).

Sorosporium saponariae Rudolphi, flower smut. Colo., N.Y. (2).

Synchytrium sp., leaf gall. Tex. (2).

S. cerastii M.T.Cook, La. (4).

S. stellariae Fckl., Mo. (5); Calif. (6).

Ustilago violacea (Pers.) Fckl., anther smut. Alaska (6).

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (2).

Dianthus

(1) *D. armeria* L., grass-pink.
(2) *D. barbatus* L., sweet-william.
(3) *D. chinensis* L., rainbow pink.
(4) *D. deltoides* L., maiden pink.
(5) *D. plumarius* L., cottage pink.

Hardy perennial herbs (2,3,4,5) of Europe and Asia: grown for ornament and sometimes naturalized, especially 2 and 4. Cultivated garden pinks are derived mostly from (3) and (5); and (1) is an annual weed.

Alternaria dianthi F.L.Stevens & Hall, blight, stem rot. Widespread in Northeastern and Central States, also Calif., Colo., Tex., P.R. (5,?3).

Ascochyta dianthi (Alb. & Schw. ex Fr.) Lib., leaf spot. N.Y. (1). Miss. (5).

Asteroma dianthi Cke. & Harkn., on stems and leaves. Calif. (5).

Botrytis cinerea Pers. ex Fr., gray mold. Alaska (3,5).

Ditylenchus dipsaci (Kuehn) Filip., leaf and stem nematode. Oreg. (2).

Fusarium oxysporum Schlecht. f. *barbati* Snvd., wilt. Calif., Kans. (2). *Fusarium* sp., causing wilt, reported in Mass., N.J., S.C., and Va., may be this.

F. poae (Pk.) Wr., bud rot. N.Y. (?5).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Heterosporium echinulatum (Berk.) Cke., leaf spot. Calif., N.Y., Oreg. (?5).

Meloidogyne sp., root knot nematodes. ?Fla. (2,3,5), Tex. (2), Miss. (5).

Mycosphaerella sp. (*Sphaerella caryophyllea* Cke. & Harkn.), on stems. Calif.

Phoma sp. (*?P. dianthi* Bub.), on stems. Va. (2), La. (5).

Phyllosticta sp. (*?Ascochyta dianthi*), leaf spot. Wash. (2).

P. silenes Pk.—Mo. (5).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,5).

Puccinia arenariae (Schum.) Wint. (III), rust. Ala., Conn., Mass., Miss., N.Y., Pa. (2); N.Y. (4).

Pythium ultimum Trow, root rot. ?Calif. (2,5).

Rhizoctonia solani Kuehn, stem rot. Conn., Ill., Kans., Mass., Miss., N.J., N.Y., Pa., Tex. (2,3,5).

Sclerotium rolfsii Sacc., southern blight. Conn., Fla., N.C. (2); Ill., Tex. (5).

Septoria dianthi Desm., leaf spot. Ala., Iowa, Mich., N.Y. (2,3); Miss., N.C., N.J., N.Y. (5).

Uromyces caryophyllinus (Schrank) Wint. (II,III), rust. Iowa, Tex. (2); Nebr. (2,3); Ill., Miss., N.Y., Tenn., Tex., Wash. O and I on *Euphorbia*, not reported in U.S. See note under *Dianthus caryophyllus*.

Ustilago violacea (Pers.) Fckl., anther smut. N.J. (2).

?Volutella dianthi Atk., anthracnose. Del., Ind., N.Y. (2); Iowa (5). See note under *D. caryophyllus*.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (2,5), Tex. (2).

?MOSAIC—The susceptibility of (2) to experimental infection with carnation mosaic virus has been demonstrated, and natural infection probably also occurs; perhaps also (3,5) but not definitely reported.

YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm). Calif. (2).

Dianthus caryophyllus L., carnation

Perennial of southern Europe and Asia, commonly grown under glass for cut flowers. Hardy garden types derived from this and *D. plumarius* also exist; these records mostly applicable to the greenhouse varieties.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall, witches'-broom. Md.

Alternaria dianthi F.L.Stevens & Hall, blight, collar and branch rot. General.

Botrytis cinerea Pers. ex Fr., gray mold of buds and flowers. Cosmopolitan under damp conditions.

Cladosporium herbarum Lk., leaf mold (probably secondary). Cosmopolitan.

Colletotrichum sp. (*?C. dematium* (Fr.) Grove), on stems, anthracnose. N.J., N.Y., Tex. Reported without specific name in N.J.; subsequently referred to *Volutella dianthi* but is better left here. *Vermicularia herbarum* West., as reported in Tex., may also be this.

Corticium stevensii Burt: SEE *Pellicularia koleroga*.

Corynebacterium fascians (Tilford) Dowson, fasciation, witches'-broom. Calif., Ohio.

Fusarium spp., root rot, dry stem rot, branch rot. General. The following species have been shown to cause diseases of this type, but specific identification is frequently lacking in reports: *F. avenaceum* (Fr.) Sacc., *F. culmorum* (W.G.Sm.) Sacc., *F. scirpi* Lambotte & Fautr. and its var. *acuminatum* (Ell. & Ev.) Wr. (all = *F. roseum* Lk. emend. Snyd. & Hans.). The following species may also be associated with these diseases but are regarded as nonparasitic: *F. heterosporum* Nees and *F. semitectum* Berk. & Rav. (=*F. roseum* sensu Snyd. & Hans.), and *F. tricinctum* (Cda.) Sacc.

Fusarium oxysporum Schlecht. f. *dianthi* (Prill. & Del.) Snyd. & Hans., wilt (perhaps also stem rot). Calif., Colo., Mass., Mich., Nebr., N.Y., Wash., probably general.

F. poae (Pk.) Wr. (=*F. tricinctum* f. *poae* (Pk.) Snyd. & Hans.), bud rot. Mass. to Va., Kans., and Nebr.: Wash.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Heteropatella valtellinensis (Trav.) Wr., leaf rot. Wash. Perhaps *H. dianthi* Buddin & Wakef. (*Pseudodiscosia dianthi* Höstermann & Laub.).

Heterosporium echinulatum (Berk.) Cke., leaf mold, "fairy ring." Occasional throughout range of greenhouse culture, also Calif., Tex. An ascigerous stage, *Didymellina dianthi* C.C.Burt, has been reported in England, not found here.

Macrosporium nobile Vize, reported in Md. and Mich.; probably a *Stemphylium*, but identity uncertain.

Meloidogyne sp., root knot nematodes. General in the South, occasional in greenhouses in the North.

Mycosphaerella caryophylli (Pass.) Cruchet, on stems. Alaska.

Oidium sp., powdery mildew. Fla., N.C.

Pellicularia koleroga Cke., web blight. N.C.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Pseudomonoas caryophylli Burkh., bacterial wilt. Ill., Ind., Iowa, Mass., Mo., Wash.

P. woodsii (E.F.Sm.) Stapp, bacterial spot. Mass. to Ga., Ind., and Mich.; also N. Dak., Okla., Oreg., Wash.

Pythium spp., root rot: *P. ultimum* Trow—Calif., Ill., Wis.; *P. vexans* d By.—Calif.

Rhizoctonia solani Kuehn, root rot, wet stem rot. General in greenhouse and outdoor culture.

Sclerotium rolfsii Sacc., southern blight. Fla., Miss., Tex.

Septoria dianthi Desm., leaf spot. Vt. to S.C., Tex., and Mich.; Calif., T.H.

Sporotrichum anthophilum Pk.: SEE *Fusarium poae*.

Uromyces caryophyllinus (Schrank) Wint. (II,III), rust. General. O and I on *Euphorbia* in Europe, not known here. Under International Rules of Nomenclature this name should be *U. dianthi* (Pers.) Niessl.

Ustilago violacea (Pers.) Fckl. Mass. (in greenhouses).

Vermicularia herbarum West. SEE *Colletotrichum*.

Verticillium dahliae Kleb. (=*V. albo-atrum* Reinke & Berth.?), wilt. N.J.

Volutella spp., on stems, ? anthracnose. Mich., N.J., N.Y., Oreg., Pa. *V. dianthi* Atk., reported in N.J., was not formally described but, as illustrated, was a *Colletotrichum*. *V. leucotricha* Atk., reported in N.Y., is a *Volutella* but was not associated with anthracnose.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif., Tex.

MOSAIC—virus. Specific reports from Colo., Ill., Ind., Iowa, N.J., N.Y., Okla., Wash., Wis., with indications that it is general in commercial stocks.

STREAK—virus. Specific reports from Colo., Ill., Iowa, N.J., N.Y., Wash., Wis.; probably general in commercial culture but less frequent than mosaic; in such stocks it occurs together with mosaic virus.

YELLOWS—name applied to the complex virosis caused by the mosaic and streak viruses together, equivalent to streak as it occurs in commercial carnations; has also been applied to diseases attributed to *Fusarium* spp.

POTASSIUM DEFICIENCY (yellow or necrotic spotting). N.J., N.Y.

Gypsophila

(1) *G. paniculata* L., babysbreath.
(2) Other species, especially *G. elegans* Bieb.

Mostly perennial herbs of Europe and Asia, (1) is grown for ornament in gardens and locally escaped throughout the United States; the annual *G. elegans* is grown under glass for cut flowers.

Bacterium gypsophilae N.A.Brown, root and stem gall. N.J. (1,2).

Botrytis cinerea Pers. ex Fr., gray-mold blight. N.J. (1).

Corynebacterium fascians (Tilford) Dows., fasciation. Ohio (1,2).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Fla. (2).

Pythium debaryanum Hesse, damping-off. Conn. (1).

Rhizoctonia solani Kuehn, damping-off, root rot. Conn. (1), Ill. (2).

YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.J. (1). Also var. *californicus* Holmes in Calif. (1).

Lychnis

(1) *L. alba* Mill., evening campion.
(2) *L. chalcedonica* L., Maltese cross.
(3) *L. coronaria* (L.) Desr., mullein-pink.
(4) *L. dioica* L., red campion.
(5) Other species.

Mostly biennial or perennial herbs of Europe and Asia, grown for ornament and frequently escaped in the Eastern and Central States.

Alternaria ?dianthi F.L.Stevens & Hall, leaf spot. Alaska (2).

Botrytis cinerea Pers. ex Fr., shoot and flower blight. Alaska (2).

Corticium galactinum (Fr.) Burt, root rot. Md. (1).

Heterosporium sp. (*?H. echinulatum* (Berk.) Cke.), leaf mold. Alaska (2,5).

Leptothyrium lychnidis Berk. & Cke., leaf spot. Ala. (5).

Phyllosticta lychnidis (Fr.) Ell. & Ev., leaf spot. Tex. (1); Iowa (3).

P. punctiformis (Desm.) Allesch. N.Y. (5).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).

Phytophthora cactorum (Leb. & Cohn) Schroet., stem rot. Ind. (5).

Puccinia arenariae (Schum.) Wint. (III), rust. Pa. (2).

Rhizoctonia solani Kuehn, root and stem rot. Ill. (2,5).

Sclerotium rolfsii Sacc., southern blight. Tex. (1).

Septoria ?lychnidis Desm., leaf spot. Mass. (5).

S. melandrii Pass. Wis. (1).

Uromyces suksdorfii Diet. & Holw. (I,II,III), rust. Utah (on *L. drummondii* S. Wats.). *U. verruculosus* Schroet. (II,III), rust. Ind., Mich., Tex. (1); N.Y. (1,4).

Ustilago violacea (Pers.) Fckl., anther smut. Minn., Wis., Wyo. (5).

Sagina

S. procumbens L., pearlwort.

Matlike perennial herb of Europe, naturalized in the Northeast; a weed in fine turf.

Rhizoctonia solani Kuehn, brown patch. Mass. to Mich.

Saponaria

(1) *S. officinalis* L., soapwort.
(2) *S. vaccaria* L.

Perennial (1) or annual (2) herbs of Europe, grown in old gardens and widely escaped in the Eastern and Central States; useful to wildlife.

Alternaria saponariae (Pk.) Neerg., leaf and stem spot. Conn. to Md., Ind., and Minn. (1).
Colletotrichum sp. (*?C. dematium* (Fr.) Grove), on stems. N.Y. (1).
Cylindrosporium officinale Ell. & Ev., leaf spot. Ind. (1).
Didymella sp., on leaves. Ga. (1).
Phyllosticta tenerrima Ell. & Ev., leaf spot. N.J., Tex. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Puccinia aristidae Tracy (O,I), rust. Colo. (2).
Rhabdospora saponariae Bres. & Sacc. N.Y. (1).
Septoria noctiflorae Ell. & Kell., leaf spot. Ill. (1).

Silene, catchfly

(1) *S. acaulis* L., cushion- pink.
(2) *S. antirrhina* L.
(3) *S. gallica* L.
(4) *S. noctiflora* L.
(5) *S. stellata* (L.) Ait., starry campion.
(6) Other species.

Perennial (1,5) or annual (2,3,4) herbs, of prairies and open woodlands; many endemic, especially in the Western States, several adventive from Europe; grown for ornament (1,5, and others), wildlife-food plants (1,2,3), or weeds (2,4).

Ascochyta silenes Ell. & Ev., leaf spot. Mont., Okla., Wis. (2).
Colletotrichum sp., on stems. Md. (6).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Leptosphaeria silenes (de N.) Rostr., on leaves. Alaska (1).
Marssonina delastrei (De Lac.) Sacc., leaf spot. Wis. (5).
Meloidogyne sp., root knot nematodes. T.H. (3).
Peronospora silenes G.W.Wils., downy mildew. Kans., Nebr., Tex., Wis. (2); Ill., Tex. (6).
Phyllosticta nebulosa Sacc. (*P. pallida* Halst.), leaf spot. Mont., N.Y., Wis. (4).
P. silenes Pk.—Nebr., N.Y., Tex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,6).
Puccinia aristidae Tracy (O,I), rust. Ariz., Tex. (2).
Rhizoctonia solani Kuehn, damping-off. Ill. (6).
Septoria dimera Sacc., leaf spot. Nebr. (2), Wis. (2,6).
Septoria spp., perhaps all referable to *S. silenes* West., but variously reported as follows: *S. noctiflorae* Ell. & Kell.—Ind., Tex. (2); Kans., N.J., Tex. (4); Wis. (4,6); *S. silenes* West.—Kans., Okla. (2); Ill. (6); *S. silenicola* Sacc.—Nebr. (2,4,5); N.Y. (4); Iowa, Md., Pa., Wis. (5); Idaho, Mont., Utah (6).
Sorosporium saponariae Rudolphi, flower smut. Colo., Nev., Utah (6).
Uromyces silenes (Schlecht.) Fckl. (O,I,II.III), rust. Pa. (4); Calif., Iowa, Kans., Mont., Wash. (6).
U. suksdorfii Diet. & Holw. (I,II,III), rust. Calif., Idaho, N. Mex., Utah, Wash. (6).
Ustilago violacea (Pers.) Fckl., anther smut. N.H. (1); Calif., Mont., Tex., Va., Wash., Wyo. (6). Var. *major* Clinton (*U. clintoniana* Cif.) is reported on *S. watsoni* in Wash.

Spergula

S. arvensis L., spurry.

Small annual of Europe, widely naturalized in waste ground, a weed in cultivated fields; useful to wildlife.

Albugo lepigoni (d By.) O.Kuntze, white-rust. Tex.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?S.C.
Peronospora obovata Bon., downy mildew. Calif., Maine, Wis., Alaska.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia arenariae (Schum.) Wint. (III), rust. Maine, N.Y., Pa., Tex.
YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif.

Spergularia

Spergularia spp., sandspurry.

Annual or biennial herbs of salt marshes and sandy waste ground; useful to wildlife.

Albugo lepigoni (d By.) O.Kuntze, white-rust. Calif., Mass.
Puccinia aristidae Tracy (O,I), rust. Calif. II and III on *Distichlis* spp.
Uromyces acuminatus Arth. var. *spartinae* (Farl.) Arth. (O,I), rust. Calif. II and III on *Spartina* spp.

Stellaria

(1) *S. borealis* Bigel.
(2) *S. longipes* Goldie, starwort.
(3) *S. media* (L.) Cyr., common chickweed.
(4) *S. graminea* L.
(5) Other species.

Mostly low annual herbs of moist ground: (1) and (2) endemic in the Northern and Central States; (3) adventive from Europe and a cosmopolitan weed; (4) a perennial of Europe, naturalized in the Northeast, may be grown for ground cover; all useful for wildlife.

Entyloma alsines Halst., leaf smut. Tex. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Isariopsis albo-rosella (Desm.) Sacc., leaf spot. Wis. (5).
Ligniera junci (Schwartz) W.R.I.Cook, in roots. Calif. (3).
Melampsorella cerastii (Pers.) Schroet. (II,III), rust. Calif., Mont., N.Y., Oreg., Utah, Wash. (1); Calif., Alaska (2); Maine, N.H., Wash. (3); Calif., Idaho, Mich., N.Y., Pa., Wash., Alaska (5). O and I on *Abies* spp.
Meloidogyne sp., root knot nematodes. Md. (3).
Mycosphaerella stellarinearum (Rab.) Johans., on leaves. Alaska.
Peronospora alsinearum Casp., downy mildew. N.C. (3); Va. (5). Author is Casp. ex d By. if based on perfect stage.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).

Puccinia arenariae (Schum.) Wint. (III), rust. Calif., Mont., Wash. (1); Alaska (2); Mont., Wyo. (5).
P. aristidae Tracy (O,I), rust. Colo., Tex. (3). II and III on *Distichlis* spp.
Rhizoctonia solani Kuehn, brown patch. Maine to Md. and Mich. (4).
Rhizomyxa hypogeae Borzi, in roots. Calif. Probably in part = *Ligniera junci.*
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Calif., S.C. (3).
Septoria jamesii Pam., leaf spot. Colo. (5).
S. stellariae Rob. & Desm.—Md., Mich., N.Y., Oreg., Tex. (3); Wis. (3,5).
Sorosporium saponariae Rudolphi, flower smut. Colo., Utah (5).
Synchytrium chiltoni M.T.Cook, leaf gall. La. (3).
S. stellariae Fckl.—La., Miss., Okla., Tex. (3).
Ustilago alsineae Clint. & Zundel, seed smut. Idaho, Wash. (5).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). N.J. (3), Calif. (5).
YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif.

CASUARINACEAE

Casuarina, Australian-pine, beefwood

Casuarina spp.
Hardwood trees of Australia, planted as street trees in Florida and California.
Armillaria mellea Vahl ex Fr., root rot. Calif.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Fomes applanatus (Pers. ex Wallr.) Gill., heart rot. T.H.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla.

CELASTRACEAE

Catha

C. edulis Forsk., Arabian-tea.
Evergreen shrub of South Africa, grown for ornament under glass or in warm regions.
Colletotrichum gloeosporioides Penz., leaf-tip blight. Fla.
Ovularia sp., on leaves. Fla.

Celastrus

(1) *C. scandens* L., climbing or shrubby bittersweet. Range 11,15,16,18,21,22,23,24,25,26, 27,28,29,30.
(2) Other species (chiefly *C. orbiculata* Thunb., oriental bittersweet).
Twining shrubs, grown for ornamental fruits and wildlife-food plants: (1) hardy in zone 2, (2) in zone 4.
Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Conn. (2).
Ascochyta sp., leaf spot. Conn. (2).
Asterina celastri Ell. & Kell. (=*?Microthyriella celastri* (Ell. & Kell.) Th.), leaf spot. Kans., Maine, Mich. (1).
Botryosphaeria ?ribis (Tode ex Fr.) Gross. & Dug. (*B. hibisci* f. *celastri* Ell. & Ev., *Dothiorella celastri* Pk.), on dead stems. Ill., N.Y., W. Va. (1).
Camarosporium abnormale (Pk.) Sacc., on dead stems. N.Y. (1).
Cercospora melanochaeta Ell. & Ev., leaf spot. Iowa, Kans., N. Dak., Nebr. (1).
Coryneum pithoideum Dearn. & House, on dead stems. N.Y. (1).
Cytospora sp., on stems. Va. (1).
C. celastri Clem.—Kans., Nebr. (1).
Diaporthe celastrina Ell. & Barth., on dead stems. Kans., Mich., N.Y. (1).
Diatrype celastrina Ell. & Ev., on dead stems. Kans. (1).
Diplodia celastri Cke., ?twig blight. Tex. (1).
D. celastrina Ell. & Barth.—Kans. (1).
Gloeodes pomigena (Schw.) Colby, on stems. Ind. (1).
Glomerella cingulata (Ston.) Spauld. & Schrenk, canker, dieback. N.C., N.H. (1).
Labrella celastri Dearn. & House (*?Leptothyrium celastri* Berk. & Curt.), on dead stems. Mass., N.Y. (1).
Microsphaera alni DC. ex Wint., powdery mildew. Wis. (1).
Nectria cinnabarina Tode ex Fr. (*?N. celastri* Schw.), on stems, ?dieback. Mich., Mo., Nebr., Pa., W. Va. (1).
Phomopsis pallens (Berk. & Curt.) Grove, on stems. N.Y. (1).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Maine to Va., Tex., and S. Dak. (1).
Phyllosticta celastri Ell. & Ev., leaf spot. Ill., Kans., Mass., N.Y., W. Va. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora obtusa (Schw.) Cke., on dead stems. N.Y., Va. (1).
Ramularia celastri Ell. & Martin, leaf spot. Vt. to Miss., Tex., and N. Dak. (1).
Sphaeropsis celastrina Pk. (=*S. propullans* (Schw.) Pk.?), on dead stems. Kans., Mich., N.Y., Wash. (1).

Euonymus (Evonymus), burning-bush, spindletree

I. Native Species

(1) *Euonymus americanus* L., strawberry-bush. Range 20,25,27,28,29,30.
(2) *E. atropurpureus* Jacq., burning-bush. Range 20,21,22,23,24,25,26,27,28,29,30.
(3) *E. occidentalis* Nutt., western burning-bush. Range 1,2,4,12.
Deciduous shrubs, sometimes planted for ornament; useful to wildlife.
Cercospora euonymi Ell.: SEE *Ramularia euonymi.*
Cladosporium fasciculatum Cda. (=*C. herbarum* Lk.?), leaf mold. Wis. (2).
Coniothyrium sp., on leaves. Wis. (2).
Haplosporella euonymi Ell. & Ev., on twigs. Nebr. (2).
Marssonina thomasina (Sacc.) Magn., leaf spot. Ill., Ind., Iowa, Mich., Mo., Ohio, Wis. (2).
Microsphaera alni DC. ex Wint., powdery mildew. Ohio to Miss., Tex., and S. Dak. (2). Sometimes reported

as *M. euonymi* (DC.) Sacc., which is not believed to occur in the U.S.
Nectria cinnabrina Tode ex Fr., on branches, ?canker. N.Y. (2).
Oidium sp., powdery mildew. Iowa (1); Tex. (2); Calif. (3). Perhaps *Microsphaera alni*.
Phyllosticta euonymi Sacc., leaf spot. Del. (2).
P. pallens Ell. & Ev.—Ala., Ind., Tex. (1); Tex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Physalospora obtusa (Schw.) Cke., on branches. Ga. (1).
Ramularia euonymi Ell. & Kell., leaf spot. Ky. (1); Ill., Iowa, Kans., Mo., Nebr., Wis. (2); Calif. (3).
Septoria atropurpurei Tehon, leaf spot. Ill. (2).
S. evonymi Rab.—S.C., Va. (1); Ind. (2).

II. Introduced Species, Deciduous

(1) *Euonymus alatus* (Thunb.) Sieb., winged spindletree. Native of China and Japan; cultivated, zone 3.
(2) *E. europaeus* L., European spindletree. Native of Europe and western Asia: cultivated, zone 3; escaped in eastern United States.
(3) Other species.

Botrytis cinerea Pers. ex. Fr., on branches, ?canker and dieback, perhaps following frost injury. N.J. (1).
Colletotrichum griseum Heald & Wolf, anthracnose. N.J., N.Y. (3).
Coniothyrium fuckellii Sacc., on twigs. Calif. (3).
Cytospora evonymi Cke., on twigs. Calif. (3).
Diplodia euonymi West. (=*D. ramulicola* Desm.?), on twigs. Ala., N.Y. (2). Perhaps a synonym of the following.
Macrophoma ramulicola (Desm.) Hoehn, on twigs. Calif. (3).
Microsphaera alni DC. ex Wint., powdery mildew. Nebr. (1).
Phomopsis foveolaris (Fr.) Trav. (=*Diaporthe laschii* Nits.), on twigs. Ohio (2).
Phyllosticta pallens Ell. & Ev., leaf spot. Ala. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Physalospora sp.. on twigs. Calif. (3).
Polyporus hirsutus Wulf. ex Fr., sapwood rot. Mass. (3).
Sirogloea euonymi Petr., on twigs. Calif. (3).

III. Introduced Species, Evergreen

(1) *Euonymus fortunei* (Turcz.) Hand.-Mazz., especially the var. *radicans* (Miq.) Rehd., climbing euonymus.
(2) *E. japonicus* L., evergreen euonymus.

Climbing (1) or upright (2) shrubs, respectively, of China and Japan; widely cultivated, (1) for wall cover, and (2) for hedges; the latter also in variegated forms; hardy in zones 5 and 7.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Conn., Mich., Miss., N.H., N.Y., Pa., S.C., Tex. (1,2).
Cercospora destructiva Rav., leaf spot. Ark., Miss., S.C., Tex., Va. (2).
Cladosporium fasciculatum Cda. (*?C. herbarum* Lk.), on leaves. S.C. (2).
Colletotrichum griseum Heald & Wolf, anthracnose. Ala. and Ga. to Tex. and Ark. (2).
Exosporium concentricum Heald & Wolf, leaf spot. Ala., Miss., S.C., Tex., Va. (2).
Fusarium lateritium Nees (=*Gibberella baccata* (Wallr.) Sacc.), on twigs, ?dieback. Calif. (2).
F. scirpi Lambotte & Fautr., root and stem rot. N.J. (2).
Gloeosporium frigidum Sacc., anthracnose. Ark., Miss. (2).
Glomerella cingulata (Ston.) Spauld. & Schrenk, on twigs, ?canker. Miss., Tex. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophoma ramulicola (Desm.) Hoehn, on twigs. La. (2).
Meloidogyne sp., root knot nematodes. Tex. (2).
Microsphaera alni DC. ex Wint., powdery mildew. Miss., Tex. (2).
Oidium euonymi-japonici (Arcang.) Sacc., powdery mildew. Calif., Iowa, La., Miss., N.J., Tex., Wash. (2).
Pellicularia koleroga Cke., thread blight. La. (2).
Pestalotia planimi Vize, on leaves. Calif., La., Tex. (2).
Phyllosticta euonymi Sacc., leaf spot. Okla. (1); Miss., Tex., Va. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (2).
Ramularia euonymi Ell. & Kell., leaf spot. Ark. (2).
Septoria evonymi Rabh., leaf spot. Miss. (2).
S. evonymella Pass.—N.J., S.C. (2).
VARIEGATION (? infectious)—Mass. (1). The common variegated forms of *E. japonicus* are perhaps due to virus infection, and the name *Marmor euonymi* Holmes has been applied, but confirmation of a virus etiology is lacking.

Pachistima

(1) *P. canbyi* A.Gray, cliffgreen. Range 27.
(2) *P. myrsinites* (Pursh) Raf., myrtle boxleaf. Range 1,2,4,9,12,13,14.

Small evergreen shrubs, cultivated for ornament or ground cover, zone 4 and 5, respectively; useful to wildlife.

Mycosphaerella pachystimae Dearn., leaf spot. Idaho (2).
Sporonema oxycocci Shear, on leaves. Va. (1).

CEPHALOTAXACEAE

Cephalotaxus

C. drupacea Sieb. & Zucc., Japanese plum-yew.

Small evergreen tree of Japan, cultivated for ornament, zone 5.
Phomopsis juniperovora Hahn, twig blight. N.Y.

CHENOPODIACEAE

Atriplex, saltbush

(1) *A. canescens* (Pursh) Nutt., fourwing saltbush.
(2) *A. confertifolia* (Torr. & Frém.) S.Wats., shadscale.
(3) *A. patula* L. var. *hastata* (L.) A.Gray.
(4) *A. polycarpa* (Torr.) S.Wats., allscale.

(5) *A. rosea* L., redscale.
(6) Other species.

Annual (3,5) or perennial (1,2,4) woody herbs or shrubs, growing mostly on arid plains and especially in saline soils throughout the West and Southwest. Some are important forage plants (1,2,4) and wildlife-food plants; some (3,5) are cosmopolitan weeds; *A. breweri* S.Wats. is grown as a hedge plant.

Cercospora dubia (Riess) Wint., leaf spot. Iowa, Mont., N. Dak., N.Y., Ohio, Tex., Wis. (3,6).
Eutypella herbicola Ell. & Ev., on stems. N. Mex. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Heterodera schachtii A. Schm., root gall. Utah (2,5,6).
Melanopsammina utahensis Petr., on stems. Utah (2).
Meloidogyne sp., root knot nematodes. Calif. (5,6; also *A. breweri*).
Neotylenchus latus Thorne, in roots. Utah (2).
Peronospora farinosa Fr., downy mildew. Mont., Tex. (3). Reported as *P. effusa* (Grev.) Rabh., but see note under *Chenopodium album* and *Spinacia oleracea;* also identified as *P. littoralis* Gäum.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3,6).
Pratylenchus aberrans (Thorne) Filip., root gall. Utah (2).
Puccinia aristidae Tracy (O,I), rust. Colo., Del., Maine, N. Dak., N.Y., Tex., Utah (3); Ariz., Colo., Nev., N. Mex., Utah (5); Colo., Tex. (6). II and III on *Distichlis spicata* and other grasses.
Stagonospora atriplicis (West.) Lind, leaf spot. N.J., N.Y., Pa. (3); Kans., Nebr. (6). Also reported as *Ascochyta atriplicis* Died., *Phyllosticta atriplicis* West. (also Desm.), and *Septoria atriplicis* (West.) Fckl.
Uromyces shearianus Arth. (O,I,III), rust. Ariz. (4); Calif. (1,6); N. Mex. (1); Colo., Utah, Wyo. (2).
Urophlyctis pulposa (Wallr.) Schroet., leaf and stem gall. N. Dak., Tex. (3).
Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). On various species especially 3 and 5; also *A. arenaria* Nutt., *A. argentea* Nutt., *A. expansa* S.Wats., and *A. serenana* A.Nels., on which the vector, *Eutettix tenellus*, overwinters.

Beta

B. vulgaris L.
(1) Garden beet.
(2) Sugar beet.

These two agronomic groups are not distinguished botanically, and records of associated organisms often do not discriminate between them. Other derivatives of *B. vulgaris* are treated as botanical varieties (see below). The cultivation of garden beets is general throughout the United States, the leading commercial centers being Texas, Louisiana, New Jersey, New York, and Wisconsin. The principal areas of sugar beet cultivation in the West are Colorado, California, Nebraska, Montana, Idaho, Utah, Wyoming and, for seed, Arizona and New Mexico; in the Central States, Michigan, Minnesota, and Ohio.

Actinomyces scabies (Thaxt.) Güssow: See *Streptomyces scabies.*
Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Occasional—Conn., Ind., N.J., Pa., Wash., Wis. (1); Calif., Colo., Idaho, Kans., Mich., Mont., Ohio, Tex., Utah (2).
?Albugo bliti (Biv.-Bern.) Kuntze, white-rust. Iowa (2), Ohio (1).
Alternaria sp., (secondary) leaf spot. Probably general but specifically reported from Calif., La., Mass., N.H., N.J., N.Y., Wash. (1); Calif., Colo., Idaho, Mich., Utah (2). Also reported as secondary storage rot in Colo. (2).
A. tenuis Nees ex Cda., seed mold. Calif. (1,2).
Aphanomyces cochlioides Drechs., black root, damping-off, taproot tip rot. Probably general; reported from Calif., Colo., Iowa, Mich., Minn., Mont., Ohio, S. Dak., Wash., Wis. (2).
Bacterium teutlium Metcalf, soft rot. Nebr. (2). Description incomplete.
Cercospora beticola Sacc., Cercospora leaf spot, blight. General (1,2).
Clasterosporium putrefaciens (Fckl.) Sacc., secondary leaf browning. Colo., Mich., Wash. (2). Reputed to be the conidial stage of *Pleospora putrefaciens* (Fckl.) Frank.
Cuscuta spp., dodder. Occasional on (2) when host follows alfalfa or other legumes in rotation; *C. campestris* Yuncker is most common; *C. californica* Choisy and *C. subinclusa* Dur. & Hilg. have been colonized on this host.
Cylindrocarpon radicicola Wr., secondary storage rot. N.Y. (2).
Diplodia sp.: See *Physalospora.*
Ditylenchus dipsaci (Kuehn) Filip., stem and leaf nematode. Kans. (1).
Erysiphe polygoni DC., powdery mildew. Calif. (2).
Fusarium spp., seedling blight, root rot, secondary black root, storage rot. General (1,2). The uncertainty of identification and the confusion of names make precise records impossible or misleading, but if due allowance is made for synonymy and the existence of specialized parasitic races, the principal species of *Fusarium* causing diseases of beets can be placed in the following 3 groups:
1. Occurring on roots:
F. culmorum (W.G.Sm.) Sacc., *F. equiseti* (Cda.) Sacc., *F. scirpi* Lambotte & Fautr.—synonyms of *F. roseum* Lk. emend. Snyd. & Hans.
F. dimerum Penz. and *F. merismoides* Cda. (*F. betae* (Desm.) Sacc.)—synonyms of *F. episphaeria* (Tode ex Fr.) Snyd. & Hans.
F. orthoceras App. & Wr. and *F. vasinfectum* Atk. var. *lutulatum* (Sherb.) Wr.—synonyms of *F. oxysporum* Schlecht. emend. Snyd. & Hans.
F. solani (Mart.) Appel & Wr.
2. Storage rots:
F. avenaceum (Fr.) Sacc., *F. culmorum* (W.G.Sm.) Sacc., *F. diversisporum* Sherb., *F. equiseti* (Cda.) Sacc., *F. flocciferum* Cda., *F. reticulatum* Mont., *F. sambucinum* Fckl., *F. scirpi* Lambotte & Fautr., *F. semitectum* Berk. & Rav., *F. trichothecioides* Wr.—synonyms of *F. roseum* Lk. emend. Snyd. & Hans.
F. dimerum Penz. and *F. merismoides* Cda.
F. argillaceum (Fr.) Sacc. and *F. javanicum* Koord. var. *radicicola* Wr.—synonyms of *F. solani* (Mart.) Appel & Wr. emend. Snyd. & Hans.
3. Wilt or Fusarium yellows:
F. conglutinans Wr. var. *betae* D.Stewart (*F. orthoceras* Appel & Wr. var. *betae* (D.Stewart) Padwick)—a specialized race of *F. oxysporum* Schlecht. emend. Snyd. & Hans. Colo., Mont., Nebr., N. Mex., S. Dak., Wyo. (2).
Gloeosporium betae Dearn. & Barth., leaf spot. Miss. (1), Mont. (2).

Helicobasidium purpureum Pat. (*Rhizoctonia crocorum* (Pers.) DC. ex Fr.), violet root rot. Ohio, W. Va. (1); occasional in Western States (Colo., Mont., Tex., Utah, Wyo.) (2).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Heterodera schachtii A. Schm., root gall. Calif., Colo., Idaho, Iowa, Minn., Mont., Nebr., S. Dak., Utah, Wyo. (2).

Heterosporium betae Dows., on leaves. Wash. (1).

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. Calif. (2).

Meloidogyne sp., root knot nematodes. Widespread, Va. to Fla., Tex., and Calif. (1); occasional in the Western States from Nebr. and Idaho to Tex. and Calif., also Ohio (2).

Mycosphaerella tabifica (Prill. & Del.) Lind. SEE *Phoma betae*, of which this is reputed to be the ascigerous stage though not based on cultural proof; some reports under this name but apparently no U.S. collections.

Neotylenchus abulbosus Steiner, nematode canker and dry rot of roots. Calif. (2).

Pellicularia filamentosa (Pat.) Rogers (*Rhizoctonia solani* Kuehn), damping-off, crown rot, dry rot canker, leaf blight. General in one phase or another (1 and 2), especially (2) in the Western States, typically only in the Rhizoctonia stage; the leaf blight form reported on (2) chiefly in humid regions (Ill., Mich., Minn., Wis.; also Colo. and Nebr.) readily produces the basidial stage.

Penicillium spp., storage rot and mold (mostly secondary), sometimes on seedlings. Cosmopolitan. *P. commune* Thom, *P. digitatum* (Fr.) Sacc., and *P. roseum* Lk. ex Thom have been specifically noted as pathogenic on beets.

Peronospora schachtii Fckl., downy mildew. Calif., Minn., Oreg., Wash. (1,2); N.J., N.Y. (1). The name is based on the conidial stage; oospores were first described by Jaczewski in 1901.

Phoma betae Frank, seedling root rot, black rot of growing roots and heart rot of mature roots; also leaf spot. Occasional (1), as cause of leaf spot and associated with heart rot (boron deficiency); general (2), especially as cause of seedling root rot and black rot of mature beets. The name *Phoma betae* was independently proposed by Frank and is not a transfer of *Phyllosticta betae* Oud., an earlier name. *Mycosphaerella tabifica* is assumed to be the ascigerous stage on the basis of association.

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., N. Mex., Tex. (1,2).

Physalospora rhodina (Berk. & Curt.) Cke. (*Diplodia tubericola* (Ell. & Ev.) Taub.), root rot. Ala. (1), ?Colo. (2).

Phytophthora drechsleri Tucker, taproot rot, wet rot. Calif., Colo., Idaho, Oreg., Utah (2).

Pseudomonas aptata (N.A.Brown & Jamieson) F.L. Stevens, black streak. Calif., Oreg., Utah, Wash. (2).

Puccinia aristidae Tracy (O,I), rust. Colo., Kans., N. Mex., Utah (2). Usually only on cotyledons and very young plants. II and III on *Aristida* and *Distichlis*.

Pythium spp., damping-off, root rot. Cosmopolitan (1,2). *P. aphanidermatum* (Edson) Fitzp., causing a fatal root rot of seedlings, is reported on (2) in Calif., Utah, and Wis.; *P. butleri* Subr. and *P. ultimum* Trow are similarly recorded in Calif., Colo., S. Dak., Wyo., and doubtless occur elsewhere; *P. debaryanum* Hesse, commonly reported on (1) and (2), is the principal cause of damping-off of beets in Iowa; *P. dissotocum* Drechs. was associated with root necrosis of (2) in Mich.; *P. butleri* causes a taproot rot of mature beets in Colo.; *P. oligandrum* Drechs., a seedling root rot in Md.

Ramularia beticola Fautr. & Lambotte (*R. betae* Rostr.), leaf spot. Calif., Oreg., Wash. (2).

Rhizoctonia sp. (spp.), damping-off, root rot, crown rot, late canker, leaf blight. Cosmopolitan. For *R. crocorum* see *Helicobasidium purpureum;* for *R. solani* see *Pellicularia filamentosa.*

Rhizopus spp., wound rot, storage rot. Cosmopolitan. Usually cited as *R. stolonifer* (Ehr. ex Fr.) Lind (*R. nigricans* Ehr.), but *R. arrhizus* A.Fisch. also has been shown pathogenic to beets.

Sclerotinia sclerotiorum (Lib.) dBy., root rot, crown rot. Conn., Ill. (1).

Sclerotium rolfsii Sacc., southern blight, sclerotial rot. N.C. to Fla., Tex., and Calif., chiefly on (1), sometimes on (2), reported in Ariz., Calif., Ga., Iowa, La., Tex.

Septoria betae West., leaf spot. Del., Ind., Mass. (1); Ind., Ohio (2).

Stemphylium botryosum Wallr., seed mold. Calif. (1,2).

Streptomyces scabies (Thaxt.) Waks. & Henrici, scab. Widespread (1), especially in the Northern States from Maine to Va. and Wash., also Calif., N.C., Tex., and Alaska; occasional (2), reported in Conn., Idaho, Ind., Iowa, Ohio.

Tylenchus penetrans Cobb, root nematode. Utah (2).

Uromyces betae (Pers.) Lév. (II,III), rust. Ariz., Calif., N. Mex., Oreg., Wash. (1,2). Cycle includes O and I but only II and III reported on *Beta* in the U.S.

Verticillium albo-atrum Reinke & Berth., wilt. Colo. (2).

Volutella oxyspora Atk., on roots. Ala. (1).

Xanthomonas beticola (E.F.Sm., N.A.Brown, & Town.) Burkh., bacterial pocket. Occasional in Central and Western States from Mich. and Iowa to Tex., Calif., Wyo.; also Md. and Va. (2).

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). General in the West from western S. Dak. and Nebr. to Tex., Calif., and Wash., also southern Ill.; commonly on (2), sometimes on (1).

MOSAIC—virus. In part *Marmor betae* Holmes, Beta virus 2 K.M.Sm.—Western States from Nebr. to Tex., Calif., and Wash.; also Md., Va. (2); Calif., Oreg., Wash. (1). In part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.—Mich., Ohio (2); also the strain of this called Western cucumber mosaic virus in Calif. (2). Mosaic caused by an unidentified virus is reported in Ind. and Minn., and a different virosis is reported under the name calico or veinbanding (but not celery calico virus) in Colo., Nebr., and N. Mex. Systemic infection of beets by inoculation with the viruses of dodder, latent mosaic, tobacco mosaic, and turnip ring spot has been demonstrated.

SAVOY—virus (*Savoia piesmae* Holmes). Colo., Iowa, Mich., Minn., Nebr., Ohio, S. Dak., Wyo. (2). Presumably related to the crinkle (leaf curl) virus of beets in Europe, but the American virus has a different vector (*Piesma cinerea* Say).

YELLOW NET—unidentified virus. Calif. (1,2).

YELLOW VEIN—unidentified virus. Colo. (2).

BLACK HEART. See PHOSPHORUS DEFICIENCY.

BLACK ROOT—partly fungus infection, especially *Aphanomyces cochlioides, Pythium* spp., *Rhizoctonia solani,* and *Phoma betae;* partly atributed to nutritional deficiencies, as organic matter, phosphorus, and nitrogen. General, especially in Calif., Mich., Mont., N.Y., Ohio, Wash., Wis. (1,2).

CHLOROSIS—mineral deficiency (iron, manganese) attributed to soil alkalinity. Mich., N.Y., R.I. (1).

GIRDLE (strangle)—constriction of taproot near soil surface; attributed to mechanical injury by wind. N.Y. (1). Perhaps also indicative of boron deficiency as reported in Ill. and Md. (1).

HEART ROT (dry rot)—boron deficiency. General, especially in humid regions as Mass., Mich., Minn., N.Y., Ohio, Wis.; also Calif., Oreg., Wash. (1,2).

PHOSPHORUS DEFICIENCY (black heart, in part.) General, reported especially in Calif., Colo., Mont., Nebr., N. Mex., Utah, Wyo.; also Mich., N.Y., Ohio, Wis. (2).

POTASSIUM DEFICIENCY (bronzing). Occasional, reported especially in Iowa, Ohio, Wash. (2).

TIPBURN (black tip) — physiological, attributed to effect of periods of low light intensity on plants grown with high nitrogen content of soil. Western States—Colo. to Ariz., Calif., and Wash. (2).

(1) *Beta vulgaris* var. *cicla* (L.) Moq., leaf beet, Swiss chard.

(2) *B. vulgaris* var. *macrorhiza*, mangel.

Widely grown for greens in home gardens (1), and for fodder and silage in the Northern States (2).

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Conn., Pa. (2).

Alternaria tenuis Nees ex Cda., seed discoloration. Calif. (1).

Cercospora beticola Sacc., leaf spot. General (1,2).

Erwinia carotovora (L.R.Jones) Holland, soft rot. Wash. (2).

Fusarium sp., root rot. Wash. (2).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Heterosporium betae Dows., leaf spot. Wash. (2).

Meloidogyne sp., root knot nematodes. La. (1).

Peronospora schachtii Fckl., downy mildew. Calif. (1).

Phoma betae Frank, root rot, leaf spot. Minn., N.Y., Va., Wash., Wis. (2).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).

Physalospora abdita (Berk. & Curt.) N.E.Stevens and *P. rhodina* (Berk. & Curt.) Cke., on leaves. Fla. (1).

Pythium aphanidermatum (Edson) Fitzp., damping-off, root rot. Calif. (1,2).

P. debaryanum Hesse—Colo., Conn., Kans., Mich., N.J., Utah, Wis. (2).

Ramularia beticola Fautr. & Lambotte, leaf spot. Wash. (1).

Rhizoctonia solani Kuehn, damping-off, root rot. N.Y. (1), Wash. (2).

Sclerotinia sp. (*?S. sclerotiorum* (Lib.) d By.), crown rot. Miss. (1), Wash. (2).

Sclerotium rolfsii Sacc., southern blight. La. (1,2), S.C. (1), Tex. (2).

Septoria betae West., leaf spot. Calif. (1).

Stemphylium botryosum Wallr., seed discoloration. Calif., Wash. (1,2).

Streptomyces scabies (Thaxt.) Waks. & Henrici, scab. Conn., Wash. (2).

Uromyces betae (Pers.) Lév. (II), rust. Calif. (1), Oreg. (1,2), Wash. (2).

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Ariz., Calif. (1); Oreg. (1,2); N. Mex., Wash. (2).

MOSAIC—virus (*Marmor betae* Holmes, Beta virus 2 K.M.Sm.). Ariz., Calif. (1); Wash. (1,2).

YELLOW NET—unidentified virus. Calif. (1).

HEART ROT (dry rot, cracked stem)—boron deficiency. N.Y. (1), Wash. (2).

Chenopodium

C. album L., goosefoot, lambsquarters.

Annual herb, a cosmopolitan weed; sometimes collected for greens.

Albugo bliti (Biv.-Bern.) Kuntze, white-rust. Miss., Tex. Reports of *A. candida* on *Chenopodium* probably belong here, but may refer to *Peronospora*.

Alternaria amaranthi (Pk.) Van Hook, leaf spot. Tex.

Aphanomyces cochlioides Drechs., root rot of seedlings. Iowa.

Cercospora beticola Sacc., leaf spot. Iowa. Natural infection observed and susceptibility of this host experimentally demonstrated.

C. dubia (Riess) Wint. (*C. chenopodii* Fres.)—Mass. to S.C., Tex., and N. Dak.

Diplodia natalensis P. Evans (=*Physalospora rhodina* (Berk. & Curt.) Cke.?), on stems. Ala.

Diplodina ellisii Sacc. (*D. hyalospora* Cke. & Ell.), on stems. N.Y. Perhaps a stem form of *Stagonospora atriplicis*.

Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y.

Dothidella longissima (Pers. ex West.) Ell. & Ev., on stems. Iowa, Kans.

Gloeosporium melleum Dearn. & Overh., leaf spot. Pa.

Hadrotrichum chenopodinum Pk., on leaves. N.Y.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Leptostromella chenopodii Dearn. & House, on stems. N.Y.

Meloidogyne sp., root knot nematodes. Okla., S.C., Wis.

Metasphaeria anthelmintica (Cke.) Dearn., on stems. N.Y.

Peronospora spp., downy mildew. Widespread, chiefly in the North, from Mass. to Va., Kans., and Wash.; occasional in the South—Miss., Okla., Tex. Two species with a common or overlapping range have been reported but not always distinguished: *P. effusa* (Grev. ex Desm.) Ces., and *P. farinosa* Fr. (*P. chenopodii* Schlecht.). The former, also called *P. variabilis* Gäum., is at least physiologically different from *P. effusa* on spinach.

Phyllosticta chenopodii West.: SEE *Stagonospora atriplicis*. *P. chenopodiicola* Tehon & Daniels reported in Ill., and *P. chenopodii-albae* Siem., in Wis., may also belong there.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Pratylenchus pratensis (De Man) Filip., root nematode. Utah.

Puccinia aristidae Tracy (O,I), rust. N. Dak. to Tex., Ariz., and Mont.; also Ind. II and III on *Aristida* and *Distichlis*.

Rhizoctonia solani Kuehn, root rot. Wash.

Sclerotinia sclerotiorum (Lib.) d By., root rot. Mont.

Stagonospora atriplicis (West.) Lind, leaf spot. General. Variously reported as *Ascochyta*, *Phyllosticta*, *Phleospora*, *Septogloeum*, and *Septoria*.

Uromyces peckianus Farl. (O,I), rust. Calif. II and III on various grasses. Correlated with *Puccinia aristidae*.

MOSAIC—virus (*Marmor betae* Holmes, Beta virus 2 K.M.Sm.). Wash.

(1) *Chenopodium capitatum* (L.) Asch., strawberry-blite.

(2) *C. glaucum* L., oak-leaf goosefoot.

(3) *C. hybridum* L., maple-leaf goosefoot.

(4) *C. leptophyllum* Nutt. ex S.Wats.

(5) *C. rubrum* L., red goosefoot.

(6) *C. ambrosioides* L., Mexican-tea, and var.

anthelminticum (L.) A.Gray, American wormseed.

Annual herbs, except (6); endemic (3,4), adventive from Europe (1,2,5), or from tropical America (6); several are used for greens or are wildlife-food plants; the seed of (6) yields a pharmaceutical oil.

Albugo occidentalis G.W.Wils., white-rust. Colo., Iowa, Wyo. (1), Mont. (5).
Cercospora anthelmintica Atk., leaf spot. N.J. to Ala. and Tex. (6).
C. dubia (Riess) Wint.—Iowa, Kans., Okla. (3); Kans., Nebr. (4); N. Dak. (5); Tex., Wis. (1,3).
C. chenopodiicola Bres.—Wis. (3).
Diaporthe arctii (Lasch) Nits., on stems. Ga. (6).
Fusarium semitectum Berk. & Rav., on stems. Md. (6).
Hendersonia bliti Clements, leaf spot. Colo. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Heterodera schachtii A.Schm., root gall. Utah (5).
Leptosphaeria anthelmintica (Cke.) Sacc., on stems. N. Dak. (2).
Leptothyrium chenopodii Dearn. & Barth., on stems. Kans. (3).
Meloidogyne sp., root knot nematodes. Ala. (6).
Mycosphaerella chenopodii Dearn. & Barth., on stems. Kans. (4).
Peronospora effusa (Grev. ex Desm.) Ces., downy mildew. Ill., Iowa, Kans., Nebr., N.J., S. Dak., Wis. (3). *P. chenopodii-glauci* Gäum. on (2) and (4) in Kans., has been reported as distinct; *P. farinosa* Fr. is reported on (3) in Iowa: See note under *Chenopodium album*.
Phyllosticta ambrosioides Thuem. & Syd., leaf spot. Del., Ill., Ind., La., N.J., N.Y. (6).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (6).
Puccinia aristidae Tracy (O,I), rust. Ariz. (2,4,5), Calif. (species not designated), Colo. (1,2,3,4,5), Mont. (2), Nebr. (3,4), N. Mex. (2,4,5), Tex. (2), Utah (4), Wyo. (5).
Pyrenophora calvescens (Fr.) Sacc., on stems. N.J., N.Y., W. Va. (6).
Rhizoctonia solani Kuehn, damping-off. Kans. (4).
Stagonospora atriplicis (West.) Lind, leaf spot. Mich., Minn., Wis. (1); Nebr. (3); N. Dak. (5); N.Y. (on *C. bonus-henricus* L.).
Uromyces peckianus Farl. (O,I), rust. Calif. (on *C. murale* L.).
Urophlyctis pulposa (Wallr.) Schroet., leaf and stem gall. S. Dak., Tex. (2).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Natural infection of (4), (6), and *C. murale* (resistant) reported in Calif.
MOSAIC—virus (*Marmor cucumeris* Holmes, muskmelon mosaic strain) Calif. Some species are also susceptible to experimental infection with beet mosaic virus.

Eurotia

E lanata (Pursh) Moq., winterfat.

Perennial, somewhat woody herb of dry plains and hills in the Western States; a valuable forage plant for wildlife and livestock.

Didymella eurotiae Fairm., on stems. N. Mex.
Phoma exigua Desm., on stems. N. Mex.
Puccinia burnettii Griff. (O.I), rust. Colo., Mont., N. Mex., Wash., Wyo. II and III on *Oryzopsis hymenoides*.
P. eurotiae Griff. (III)—Calif., Nev., Utah.

Kochia

K. scoparia (L.) Schrad., summer-cypress.

Old World annual, cultivated for ornament, especially the var. *trichophylla* Bailey, also under test as a forage crop in the West; sometimes escaped and locally established.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia aristidae Tracy (O,I), rust. Colo., Nebr., Tex.
Pythium debaryanum Hesse, damping-off. S. Dak.
Rhizoctonia solani Kuehn, root rot. Tex.
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif.

Salicornia, glasswort

(1) S. *europea* L.
(2) *S. perennis* Mill.

Annual (1) or perennial (2) woody herbs in salt marshes, widely distributed in the United States; useful to wildlife.

Mycosphaerella salicorniae (Auers.) Lindau, on stems. Conn.
Pleospora salsolae Fckl., on stems. Mass. (1); Tex. (2).
Protomyces conglomeratus Pk., stem gall. N.Y. (1).
Uromyces peckianus Farl. (O,I), rust. Calif., Tex., Wash. (2). II and III on *Aristida* and *Distichlis*.

Salsola

S. kali L., saltwort, especially the var. *tenuifolia* Tausch (*S. pestifer* A.Nels.), Russian-thistle.

Cosmopolitan annual of saline or alkaline soils, often a troublesome weed on range lands, but of some forage value when young.

Melanospora townei Griff., on stems. S. Dak.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Pleospora lecanora (Fabre) Rehm, on stems. N. Dak.
Puccinia aristidae Tracy (O,I), rust. Ariz., Colo., Nebr., N. Mex., Tex., Utah.
Pyrenophora salsolae Griff., on stems. N. Dak.
Pythium debaryanum Hesse, root rot. Minn.
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett). Calif.

Spinacia

S. oleracea L., spinach.

Annual, of southwestern Asia, widely cultivated for greens; an important truck and canning crop in Texas, California, Oklahoma, Virginia, New York, and New Jersey.

Albugo occidentalis G.W.Wils., white-rust. Ark., Okla., Tex., ?Va.
Alternaria sp. (probably *A. tenuis* Nees ex Cda.), seed mold, secondary leaf spot. Conn., Ohio, S.C.
Aphanomyces cladogamus Drechs., root rot. N.J., Va.
Cercospora beticola Sacc., leaf spot., Calif., Ga., Ill., Iowa, Mass., N.Y., Tex. Perhaps a distinct species, though probably at times confused with this, is *C. flagelliformis* Ell. & Halst., a nomen nudum, reported in Del., Ga., Ind., Minn., and N.J. *C. beticola* from *Beta vulgaris* has been shown pathogenic to spinach. *C. dubia* (Riess) Wint. is also reported on this host in Mo.

Cladosporium macrocarpum Preuss, leaf mold (secondary). Del., Okla., Pa., Tex.
C. subnodosum Cke.—Del., S.C.
Colletotrichum spinaciae Ell. & Halst., anthracnose. Conn., La., Miss., N.J., N.Y., Tex., Va.
Curvularia inaequalis (Shear) Boed., seed mold.
Entyloma ellisii Halst., leaf smut. N.J.
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. General in transit and markets.
Fusarium spp., root rot, crown rot, wilt. General. A form of *F. solani* (Mart.) Appel & Wr. has been particularly cited as associated with spinach wilt in Tex.; *F. oxysporum* Schlecht. f. *spinaciae* (Sherb.) Snyd. & Hans. is reported from Calif., Conn., Idaho, Md., N.Y., Tex., Va.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Heterosporium variabile Cke., leaf mold (pinhead "rust"). General.
Meloidogyne sp., root knot nematodes. Ariz., Ga., Ind., S.C., Tex., Va.
Peronospora effusa (Grev. ex Desm.) Ces., downy mildew. General. This is sometimes cited as (Grev.) Rabh., but the transfer to *Peronospora* was made by Cesati; the author is Grev. ex d By. if based on oospores. The form on spinach is said to differ morphologically and physiologically from that on *Chenopodium* and other genera of the family, and is therefore entitled to specific rank as *P. spinaciae* Laub. *P. effusa* was originally described on spinach and, though not recognized by Fries, the name was satisfactorily validated by Desmazières. If any different name is required the form on *Chenopodium* should bear it, that on spinach remaining *P. effusa*. This need is perhaps adequately met by *P. farinosa* Fr., which is sometimes redundantly cited (Fr.) Keissler.
Phyllosticta chenopodii Sacc., leaf spot. Del., N.J., N.Y., Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Phytophthora sp., crown rot. Ariz., Ind., N.J., N.Y.
P. drechsleri Tucker, black root rot. T.H.
P. megasperma Drechs.,—Calif., N.C., N.Y.
Puccinia aristidae Tracy (O,I), rust. Ariz., Calif., Colo., Oreg., Wash. II and III on *Aristida* and *Distichlis*.
Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larsen, secondary root rot. Iowa.
Pythium spp., seed decay, preemergence damping-off, root rot. Calif., Northeastern and Central States. Commonly reported as *P. debaryanum* Hesse. *P. anandrum* Drechs., *P. aphanidermatum* (Edson) Fitzp., *P. helicoides* Drechs., *P. irregulare* Buis., *P. polytylum* Drechs., *P. rostratum* Butl., and *P. ultimum* Trow also have been identified in Calif.; *P. dissotocum* Drechs. and *P. salpingophorum* Drechs. in Va.; *P. vexans* d By. in T.H.
Rhizoctonia solani Kuehn, damping-off, root rot. General.
Sclerotinia sclerotiorum (Lib.) d By., crown rot. Ga., N.Y.
Stagonospora spinaciae Ell. & Ev., leaf spot. S. Dak.; also ? Tex. as *Septoria* or *Phyllosticta* sp.
Stemphylium botryosum Wallr., seed mold. Cosmopolitan.
Verticillium sp., wilt. N.Y.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif., Oreg., Tex., Utah, Wash.
MOSAIC (blight)—virus. In part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm., reported especially in the Middle Atlantic and Southern States, occasionally from other spinach-growing areas except the Pacific Northwest. Yellow dwarf, as reported in Calif., may be caused by this virus. Besides the cucumber mosaic virus, the viruses of Western cucumber mosaic, beet mosaic, celery calico, turnip (cabbage) mosaic, and tobacco ring spot can induce systemic infection in spinach; one or more of these may be involved in field infections in different areas.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., T.H.
YELLOW DWARF. See MOSAIC.
YELLOWS—in part, virus (*Chlorogenus callistephi* Holmes and var. *californicus*, Callistephus viruses 1 and 1A K.M.Sm.). Calif., N.J., Tex. In part physiological, attributed to nutrient deficiency, as magnesium (N.J., N.Y., Va.), manganese (N.J., N.Y., R.I.), or undetermined (Conn., Mass., Md., Ky., S.C., Tex., Va., Wash.)

CISTACEAE

Crocanthemum

C. canadense (L.) Britton, frostwort.

Woody perennial herb of the Eastern and North Central States, grown in rock gardens; useful to wildlife.

Cylindrosporium eminens J.J.Davis, leaf spot. Wis.

Helianthemum

H. nummularium (L.) Mill., sunrose.

Evergreen woody herb of Mediterranean region, grown in rock gardens and for ground cover.

Cylindrosporium eminens J.J.Davis, leaf spot. Tex., Wis.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Septoria chamaecisti Vest., leaf spot. Wash.

Hudsonia

H. tomentosa Nutt., beach-heather.

Low evergreen shrub of the Northeastern and North Central States, sometimes grown for ground cover on seashores.

Gnomonia conradii (Ell.) Wehm., on stems. N.J.

CLETHRACEAE

Clethra

(1) *C. alnifolia* L., white-alder, sweet pepperbush. Range 25,27,28,29,30.

(2) Other species.

Deciduous shrubs, (1) sometimes cultivated for ornament, zone 3.

Corticium galactinum (Fr.) Burt, root rot. Md. (1).
Cryptosporella sp., on branches. Md.
Diaporthe tuberculosa (Ell.) Sacc. var. *corymbosa* (Cke. & Ell.) Wehm., on branches. Md., N.Y. (1).

Phyllosticta clethrae Syd., on fading leaves. Mass. (1).
P. clethricola Ell. & Martin, leaf spot. Md., N.J., Tex. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora obtusa (Schw.) Cke., on branches. N.J. (1).
Scleroderris crypta (Cke.) Sacc., on dead branches. N.J. (1).
Sphaeronema clethrincola Ell., on branches. N.J., N.Y. Conidial stage of *Cenangella urceolata* (Ell.) Sacc. ?
Synchytrium vaccinii Thomas, red leaf gall. N.J.

COMBRETACEAE

Bucida

B. buceras L., black-olive.

Tropical American tree, grown for shade and ornament.

Trabutia bucidae Chardon, black leaf speck. P.R.

Terminalia

T. arjuna Wight & Arn.

Large tree of tropical Asia, grown for shade and ornament in southern Florida.

Pestalotia disseminata Thuem., leaf spot (?secondary). Fla.
Phomopsis sp., leaf spot (?secondary). Fla.
Phyllosticta sp., leaf spot. Fla.

COMMELINACEAE

Commelina

(1) *C. nudiflora* L., creeping dayflower.
(2) *C. virginica* L., Virginia dayflower.
(3) Other species.

Perennial herbs, usually in moist ground, in the Eastern and Central States and south through tropical America; sometimes weeds in cultivated fields; useful to wildlife.

Colletotrichum commelinae Ell. & Ev., leaf spot. Fla., Tex. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Illosporium commelinae F.L.Stevens, leaf spot. P.R. (2,3).
Meloidogyne sp., root knot nematodes. T.H. (1), Fla. (3).
Mycosphaerella tetraspora Seaver, leaf spot. Tex., P.R. (3).
Omphalia flavida Maubl. & Rangel, on leaves. P.R. (1).
Phakopsora commelinae Gäum. (II,III), rust. Guam (1).
P. tecta Jacks. & Holw. (II,III).—P.R. (2,3).
Phyllosticta commelinicola E.Young, leaf spot. Okla., Tex., P.R. (1).
Puccinia commelinae Holw. (II,III), rust. Tex. (3). O and I unknown.
Pythium arrhenomanes Drechs., root rot. T.H. (1).
Uromyces commelinae (Speg.) Cke. (II,III), rust. P.R. (2); Fla., Tex., V.I. (3). O and I unknown.
MOSAIC—virus. In part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm., reported in Fla. and T.H.; in part unidentified, P.R., T.H.

Tradescantia

(1) *T. fluminensis* Vell., wandering-Jew.

Prostrate perennial herb of South America, grown indoors for ornamental foliage and naturalized in the Far South.

(2) *T. virginiana* L., spiderwort.
(3) Other species.

Erect perennial herbs: (2) in open woodlands in the Middle Atlantic and Central States, often cultivated for ornament; (3) usually on sandy plains in the Central and Plains States and southward.

Botrytis cinerea Pers. ex Fr., gray-mold leaf blight. Alaska (1).
Cladochytrium replicatum Karling, on leaves (? weakly parasitic). N.Y. (1).
Colletotrichum sp., leaf spot. Tex. (1), N.J. (2).
Cylindrosporium tradescantiae Ell. & Kell., leaf spot. Iowa (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Oreg., Tex. (1).
Septoria tradescantiae (Ell. & Kell.) J.J.Davis, leaf spot. Wis. to Tex. and S. Dak. (2,3).
Uromyces commelinae (Speg.) Cke. (II,III), rust. Tex., P.R. (3).

COMPOSITAE

Achillea, yarrow

(1) *A. millefolium* L., milfoil.
(2) *A. lanulosa* Nutt.
(3) *A. ptarmica* L.
(4) Other species.

Hardy perennial herbs of Europe and North America: (3) cultivated for ornament; (1,2) weeds; useful for wildlife.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Ind. (3).
Camarosporium compositarum (Cke. & Harkn.) Sacc., on stems. Calif. (1,4).
Comandra pallida A. DC., parasitic on roots. Wash. (1).
Cuscuta sp., dodder. N.H. (4).
Erysiphe cichoracearum DC., powdery mildew. Mo., Mont., Pa., S. Dak., Vt., Wis. (1); Alaska (4).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Oreg.
Phoma erysiphoides Ell. & Ev., on stems. Colo. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Puccinia millefolii Fckl. (III), rust. Calif., Colo., Idaho, Mont., N.Mex., Oreg., Tex., Utah, Wash., Wyo. (1,2).
Rhizoctonia solani Kuehn, root and stem rot. General (1).

Actinomeris

A. alternifolia (L.) DC., yellow ironweed.

Coarse perennial herb of the Central and Eastern States, and southward; sometimes grown in wild gardens.

Cercospora anomala Ell. & Halst., leaf spot. Iowa.
Diaporthe arctii (Lasch) Nits. var. *achilleae* (Auers.) Wehm., on stems. Ind.
Erysiphe cichoracearum DC., powdery mildew. Pa. to Va. and Kans.
Gloeosporium sp., leaf spot. W. Va.
Puccinia verbesinae Schw. (O,I,II,III), rust. Maine, Md., Tenn.
RING SPOT—virus (*Marmor annularium* McK., Nicotiana virus 12 K.M.Sm.). Va.

Ageratum

(1) *A. conyzoides* L.
(2) *A. houstonianum* Mill.
(3) Other species.

Annual herbs, mostly of tropical America, cultivated for ornament.

Cercospora agerati F.L.Stevens, leaf spot. T.H. (1).
Erysiphe cichoracearum DC., powdery mildew. Md. (1).
Puccinia conoclinii Seym. (II,III), rust. Ga., Miss., N.C., P.R., T.H. (1). O and I unknown.
Pythium mamillatum Meurs, root rot. ? Calif. (2).
Rhizoctonia solani Kuehn, root and stem rot. Ill., N.J., N. Mex. (1,3).
Sclerotium rolfsii Sacc., southern blight. N.C., N.J. (1,2).

Agoseris

Agoseris spp.

Mostly perennial herbs of prairies and plains in the Western States; some useful to wildlife.

Bremia lactucae Regel, downy mildew. Colo., Wash. See note under *Lactuca*.
Entyloma compositarum Farl., white smut. Colo.
Ovularia compacta Ell. & Ev., leaf spot. Colo.
Puccinia extensicola Plowr. var. *hireaciata* (Schw.) Arth. (O,I), rust. Colo., Mont., Wyo. II and III on *Carex* spp.
P. hieracii (Schum.) Mart. (O,I,II,III), rust. Wis. to Colo., Ariz., Calif., and Wash.
P. maculosa Schw. (III), rust. Wash., Wyo.
P. stipae Arth. (O,I), rust. Colo. II and III on *Stipa* spp.
P. suksdorfii Ell. & Ev. (O,III), rust. Mont. to Ariz., Nev., and Wash.
Ramularia agoseridis Ell. & Ev., leaf spot. Calif., Colo., Wash., Wyo.
Sphaerotheca humuli (DC.) Burr., also var. *fuliginea* (Schlecht.) Salm., powdery mildew. Calif., Colo., Mont., Nev., Utah, Wash., Wyo.

Ambrosia, ragweed

(1) *A. artemisiifolia* L., common ragweed.
(2) *A. bidentata* Michx., lanceleaf ragweed.
(3) *A. psilostachya* DC., western ragweed.
(4) *A. trifida* L., giant ragweed.

Coarse annuals, widely distributed in the United States (1,4), Central States and southward (2), or Western States (3); noxious weeds, especially (1) and (4), but furnish food for wildlife.

Albugo tragopogonis Pers. ex S.F.Gray, white-rust. Maine to Ala., N. Mex., and Wis. (1); Iowa to Tex., N. Dak., and Utah (3,4).
Cercospora arcti-ambrosiae Halst., leaf spot. N.J., Okla., T.H. (4).
C. ferruginea Fckl. var. *ambrosiae* (Seym. & Earle) J.J.Davis—Wis. (1,3); N.J. to Mo. and N. Dak. (4).
Cuscuta spp., dodder. Md. (1), Pa., Tex. (4). *C. cuspidata* Engelm.—Nebr.; *C. gronovii* Willd.—N.Y. (1,4); *C. indecora* Choisy—Tex. (4).
Diaporthe arctii (Lasch) Nits., on stems. Ga. (1,4); La. (4).
Didymella prominens Ell. & Ev., on stems. La. (4).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (1).
Entyloma compositarum Farl. and *E. polysporum* (Pk.) Farl., white smut. Maine to Fla., Tex., and Iowa (1); Ill. (2); Kans., Wis. (3); N.Y. to Md., Mo., and Wis. (4). The 2 species, differing mainly in spore size, are inextricably mingled in reports.
Erysiphe cichoracearum DC., powdery mildew. General (*).
Monochytrium stevensianum Griggs, in cells of leaves and petioles. N.C. (1).
Ophiobolus spp., on stems, probably all saprophytic but the following are commonly reported: *O. acuminatus* (Sow. ex Fr.) Duby—N.Y.; *O. anguillides* (Cke.) Sacc.—Ga., Ind., N. Dak. (4); *O. fulgidus* (G.W.Clint. & Pk.) Sacc.—Ind., N.J., N.Y. (4).
Ormathodium ambrosiae Olive, leaf spot. La. (4).
Phyllachora ambrosiae (Berk. & Curt.) Sacc., leaf spot. Ala., Fla., Miss., S.C., Va., Wis. (1); Nebr., Wis. (3); Ala., Ind., Wis. (4).
Phyllosticta ambrosiae J.J.Davis, leaf spot. Wis. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (*).
Physalospora arthuriana Sacc.: SEE *Phyllachora ambrosiae*.
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Maine to N.C., Colo., and Wis. (1); Wis. to Tex. and Mont. (3); N.Y. to Va., Tex., and Minn. (4).
Protomyces andinus Lagh., stem gall. Wis. (1,4).
Pseudomonas solanacearum E.F.Sm., bacterial wilt. N.C., ?Wis. (1).
Puccinia canaliculata (Schw.) Lagh. (O,I), rust. N.C., ? N. Dak. (1); Conn., Ill., Ind., Mo. (4). II and III on *Cyperus* spp. *P. xanthii* Schw. (III), rust. Va. to Fla., Tex., and Nebr. (1); Wis. to Colo. and Mont. (3); N.Y. to Ala., Tex., and Mont. (4).
Pyrenopeziza atrata Pers. ex Fckl., on stems. N. Dak., ?Pa. (4).
Pythium palingenes Drechs., rootlet rot. Va. (4).
Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot. Tex. (on *A. aptera* DC.).
R. solani Kuehn, root rot. Nebr. (3); Tex. (*).
Rhodochytrium spilanthidis Lagh., red leaf spot. Ala., Ga., Md., N.C., S.C., Tenn. (1); N.C. (2); Ala. (4).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Fla. (1).
Sclerotium bataticola Taub., charcoal rot. Tex. (2).
S. rolfsii Sacc., southern blight. Fla. (1); Tex. (*).
Septoria ambrosiicola Speg., leaf spot. Tex. (on *A. aptera*).
S. bacilligera Wint.—Ill., Kans., Mo., Okla., Wis. (4).
Stagonospora ambrosiae Savile, on leaves. N. Dak. (4).
Uromyces junci (Desm.) C.Tul. (O,I), rust. Calif., Colo., Nebr., N. Dak. (3). O and I on *Juncus* spp.
MOSAIC—virus. *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.., Fla. (1). Unidentified, N.Y. (1,4).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Md., N.Y., Tex., Wis. (1); N.Y., Wis. (4).

Anaphalis

A. margaritacea (L.) Benth. & Hook., including var. *subalpina* A.Gray, pearleverlasting.

Perennial herb of Europe and North America, grown for ornament and used mostly as a dried flower.

Mycosphaerella confinis (Karst.) Dearn. & House, on fading leaves. N.Y.
Septoria margaritaceae Pk., leaf spot. N.Y., Oreg., Wis.
Uromyces amoenus Syd. (III), rust. Calif., Idaho, Mich., Mont., Oreg., Wash., Wyo.

Antennaria, everlasting, pussytoes

Antennaria spp.

Low perennial herbs of waste ground, often indicative of impoverished soil; mostly northern distribution, some species extending to Virginia, Colorado, and California; some grown in rock gardens, some furnish food for wildlife.

Albugo tragopogonis Pers. ex S.F.Gray, white-rust. Ill., Nebr.
Globulina antennariae Hasselbring, on leaves. N.Y.
Phoma antennariae Clements, leaf spot. Colo.
Phyllosticta antennariae Ell. & Ev., leaf spot. Del., Wis.
Septoria lanaria Fairm., leaf spot. N.Y.
S. mollisia Dearn. & House—N.Y.
Venturia fimbriata Dearn. & House, on leaves. N.Y.

Anthemis, camomile

(1) *A. arvensis* L.
(2) *A. cotula* L.

European annuals, widely naturalized in waste ground, often becoming weeds in meadows. Other species are grown for ornament and as culinary herbs.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md. (1), Fla. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Rhizoctonia solani Kuehn, damping-off. Wash. (1).
YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, *Callistephus* virus 1A K.M.Sm.). Calif. (2).

Aplopappus, goldenweed

Aplopappus spp.

Perennial, often woody, herbs and shrubs, mostly occurring on dry plains and foothills in the Western States; sometimes troublesome range weeds, one causes livestock poisoning; others are wildlife-food plants.

Coleosporium solidaginis (Schw.) Thuem. (II,III), rust. Mont. (on *A. lanceolatus* (Hook.) Torr. & Gray).
Erysiphe cichoracearum DC., powdery mildew. Colo., Wyo.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia grindeliae Pk. (O,III), rust. On various species from Nebr. to Tex., Calif., and Mont.
P. marianae Syd. (III), rust. Fla. (on *A. phyllocephalus* var. *megacephalus* (Nash) Hall.).
P. stipae Arth. (O,I), rust. Colo. (on *A. nuttallii* Torr. & Gray). II and III on *Stipa* spp.
Syncarpella tumefaciens (Ell. & Harkn.) Th. & Syd., stem gall. Colo.
Thecaphora piluliformis Berk. & Curt., inflorescence and leaf smut. Ariz., Calif.

Arctium

(1) *A. lappa* L., great burdock.
(2) *A. minus* Bernh., common burdock.

Coarse perennial herbs of Europe, naturalized, especially (2), in waste ground throughout the Eastern and Central States; useful to wildlife.

Ascochyta lappae Kab. & Rub., leaf spot. Ind. (1), N.Y. (2).
Cercospora arctii F.L.Stevens, leaf spot. T.H. (1).
C. arctii-ambrosiae Halst.—N.C., N.J. (1); Tex. (1,2); Wis. (2).
Diaporthe arctii (Lasch) Nits., on stems. Tex. (1,2); Mich. (2).
Erysiphe cichoracearum DC., powdery mildew. Iowa, Kans. (2); Tex. (1,2).
Gloeosporium lappae Dearn. & House, leaf spot. Tex. (1,2); N.Y. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Ohio (2).
Phlyctaena arcuata Berk., leaf spot. Tex. (1,2).
Phyllosticta lappae Sacc., leaf spot. Maine to N.C., Tex., and Wis. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Puccinia bardanae (Wallr.) Cda. (O,I,II,III). Mass. to N.C., Mo., and N. Dak. (1,2); Utah (2).
Rhabdospora arctii Kauff., on stems. Mich. (2).
Septoria lapparum Sacc., leaf spot. Ind., Mass., Mich. (1); Wis. (2).
Sphaeropsis lappae Ell. & Ev., leaf spot. Tex. (1,2).
MOSAIC—unidentified virus. N.Y. (1,2).
STREAK—virus (*Annulus orae* Holmes, Nicotiana virus 8 K.M.Sm.). Wis. (1).

Arctotis

A. stoechadifolia Berg., including var. *grandis* (Thunb.) Less.

Annual of South Africa, grown for flowers and characteristic wooly foliage.

Cercospora sp., leaf blotch. Fla.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Arnica

Arnica spp.

Perennial herbs of Europe and North America, the native species, *A. cordifolia* Hook., *A. foliosa* Nutt., *A. latifolia* Bong., and others, occurring mostly in mountain meadows and woodlands in the Western States from California to Alaska; some are grown in rock or wild gardens; the European *A. montana* L. is used medicinally.

Entyloma arnicale Ell. & Ev., white smut. Colo., Idaho, Mont., Utah, Wash., Wyo., Alaska.
Erysiphe cichoracearum DC., powdery mildew. Colo.
Ovularia hughesiana Sacc., leaf spot. Mont.
Phyllosticta arnicae (Fckl.) Sacc., leaf spot. Colo., Mont., Utah, Wyo.
Puccinia arnicalis Pk. (II,III), rust. On numerous species from Alaska to Mont., Colo., and Calif. O and I unknown.
Sphaerotheca humuli (DC.) Burr. var *fuliginea* (Schlecht.) Salm., powdery mildew. Calif., Wash., Wyo., Alaska.
Uromyces junci (Desm.) L.Tul. (O,I), rust. Calif., Colo., Mont., Oreg., S. Dak., Wyo. II and III on *Juncus* spp.

Artemisia

I. Wormwood, Mugwort

(1) *Artemisia abrotanum* L., oldman wormwood.
(2) *A. absinthium* L., common wormwood.
(3) *A. biennis* Willd., biennial wormwood.
(4) *A. sacrorum* Ledeb., Russian wormwood.
(5) *A. vulgaris* L., mugwort wormwood.

Introduced perennial herbs, often woody, cultivated for medicinal (vermifuge) and flavoring properties, or for ornament (1,2,4,5); or a biennial herb of the Western and Central States, useful to wildlife (3).

Albugo tragopogonis Pers. ex S.F.Gray, white-rust. Iowa, Mont., N. Dak., S. Dak., Tex., Wis. (3).
Cercospora ferruginea Fckl., leaf spot. N.Y., Wis. (2).
C. olivacea Otth (*C. absinthii* (Pk.) Sacc.), leaf blight. N. Dak., N.J., N.Y. (2).
Didymella effusa (Niessl) Sacc., on stems. N. Dak., Utah (3).
Diplodia abrotani Fckl., on stems. N. Dak. (1).
Erysiphe cichoracearum DC., powdery mildew. Calif. (3,5); Iowa, S. Dak., Tex. (3).
Gloeosporium heterophyllum Ell. & Ev., leaf spot. Calif. (5).
G. phyllachoroides Ell. & Ev., on leaves. Calif. (5).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla. (4).
Peronospora leptosperma d By., downy mildew. Iowa, Minn., N. Dak., S. Dak., Wis. (3). Also reported as *P. artemisiae-biennis* Gäum.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Physalospora obtusa (Schw.) Cke., on stems. S. Dak. (5).
Puccinia absinthii (Hedw. f.) DC. (O,I,II,III), rust. Calif. (5).
P. atrofusca (Dudl. & Thomp.) Holw. (O,I), rust. N. Dak. (3). II and III on *Carex* spp.
P. millefolii Fckl. (III), rust. Calif. (5).
Septoria fusca Pk., on leaves. N.Y. (5).
Synchytrium aureum Schroet., leaf gall. Tex., Wis. (3).
Systremma artemisiae (Schw.) Th. & Syd., black pustule. Pa. (1).

II. Sagebrush

(1) *Artemisia frigida* Willd., fringed sagebrush.
(2) *A. gnaphalodes* Nutt., cudweed.
(3) *A. ludoviciana* Nutt., Louisiana sagebrush.
(4) *A. tridentata* Nutt., big sagebrush.
(5) Other species.

Mostly perennial woody herbs or shrubs, native to plains, foothills, and mesas throughout the Western States; some afford a significant amount of browse for livestock and wildlife (1,5), some are useful for fuel or furnish medicinal ingredients, a few are grown for ornament.

Acanthostigma occidentale (Ell. & Ev.) Sacc., on leaves. Ill., Iowa, Wis. (3).
Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska (5).
Camarosporium compositarum (Cke. & Harkn.) Sacc., on stems. N. Mex. (1); Calif., Wash. (5).
Cercospora ferruginea Fckl., leaf spot. Wis. (3).
C. olivacea Otth—N.Y. (5).
Clasterosporium dothideoides Ell. & Ev., on stems. Mont. (5).
Comandra pallida A.DC., parasitic on roots. Wash. (4).
Cuscuta sp., dodder. Tex. (5).
Cylindrosporium artemisiae Dearn. & Barth., leaf spot. Wash. (5), Wis. (3,5).
Erysiphe cichoracearum DC., powdery mildew. Wis. to N. Mex., Calif., and Wash.; Alaska (3,5).
Gibberidea artemisiae Earle, on stems. Nev. (5).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Heterosporium sp., leaf spot. Alaska (5).
Leptosphaeria artemisiae (Fckl.) Auers., on stems. Nebr. (1), N. Dak. (3,5), Mont. (5).
L. tetonensis (Ell. & Ev.) Rehm—N. Dak. (1), Mont. (5).
Meloidogyne sp., root knot nematodes. Ala. (3).
Mycosphaerella eriophila (Niessl) Dearn., on leaves. Alaska (5).
Peronospora leptosperma d By., downy mildew. Calif., Iowa, Kans., N. Dak. (3); Wis. (3,5). Also reported as *P. sulfurea* Gäum. in Calif., Kans., "Dakota" (3); Iowa (5).
Phyllosticta raui (Pk.) Dearn. & House, leaf spot. Mont. (3); Wyo. (4); Colo. (5). Also reported as *Macrophoma raui* (Pk.) Berl. & Vogl.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (5).
Placosphaeria sp. (*?P. haydeni* (Berk. & Curt.) Petr.), on stems. Calif. (5).
Plowrightia tuberculiformis (Ell.) Sacc., on stems. Calif. (5).
Puccinia absinthii (Hedw.f.) DC. (O,I,II,III), rust. Wis. to Tex., Calif., and Wash., also T.H. (*).
P. atrofusca (Dudl. & Thomp.) Holw. (O,I), rust. Iowa to Tex., Calif., and Oreg. (*). II and III on *Carex* spp.
P. millefolii Fckl. (III)—N. Dak. to Tex., Calif., and Wash., also Alaska (*).
Pryenopeziza artemisiae (Lasch) Rehm ex Sacc., on stems. N. Dak. (4).
Ramularia artemisiae J.J.Davis, leaf spot. N.Y., Wis. (5).
Rhabdospora ellisii Sacc., on stems. Colo. (5).
Rosellinia ovalis (Ell.) Sacc., on stems. Utah (5).
Sclerotium sp., stem blight. Oreg. (5).
Septoria artemisiae Pass., leaf spot. Wash. (5).
Syncarpella tumefaciens (Ell. & Harkn.) Th. & Syd., stem gall, black knot. Nev., Utah (4); Calif., Mont. (5).
Thalesia fasciculata (Nutt.) Britton, parasitic on roots. Wyo. (4).
Uromyces oblongisporus Ell. & Ev. (III), rust. Wyo. (4).

Aster

(1) *A. alpinus* L., rock aster.
(2) *A. cordifolius* L., blue wood aster.
(3) *A. ericoides* L., white heath aster.
(4) *A. laevis* L., smooth aster.
(5) *A. novae-angliae* L., New England aster.
(6) *A. novi-belgii* L., New York aster.
(7) *A. ptarmicoides* (Nees) T. & G., white upland aster.
(8) Other species.

Numerous perennial and a few annual herbs, predominantly North American and distributed throughout the United States, in prairies, woodland borders, and waste ground. The listed species are the source of most of the cultivated hardy asters.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Conn. (8).

Alternaria sp. (?*A. tenuis* Nees ex Cda.), secondary leaf spot. Mich., Tex., Vt. (8).

?Aphelenchoides ritzema-bosi (Schwartz) Steiner & Buhrer, leaf nematode. Conn.

Ascochyta compositarum J. J. Davis, leaf spot. Wis. (8).

Asteromella asteris Pk., on leaves. Kans., Nebr. (8). *A. astericola* J. J. Davis, Wis. (3,8), is perhaps the same.

Basidiophora entospora Roze & Cornu, downy mildew. Ill., Ind., Md., Mo. (5); Nebr. (8); Wis. (4,5,8).

Botrytis cinerea Pers. ex Fr., gray-mold blight. Conn., N.J., Alaska (8).

Cercospora asterata Atk., leaf spot. Tex. (1,8); Ala. (8).

C. quarta Chupp & Greene—Wis. (8).

C. tertia Chupp & Greene—Wis. (7).

C. viminei Tehon—Ill. (8).

Cercosporella cana (Pass.) Sacc., leaf spot. Oreg., Wis. (8).

Cladosporium astericola J. J. Davis, on leaves. Iowa, Wis. (8).

Clypeoporthella brencklei Petr., on stems. N. Dak. (8).

Coleosporium solidaginis (Schw.) Thuem. (II, III), rust. Throughout the U. S., more frequent north and west (* except 7, and many others). O and I on 2- and 3-needle pines.

Comandra umbellata (L.) Nutt., parasitic on roots. Md., Va.

Cuscuta spp., dodder: *C. glomerata* Choisy, *C. gronovii* Willd., and *C. indecora* Choisy are reported, chiefly in the Eastern and Central States.

Diaporthe linearis (Nees ex Fr.) Nits., on stems. Ga., Mich., N.J., N.Y. (8).

Discosphaerina pseudhimantia (Rehm) Petr., black spot on stems, leaves, and bracts. N.Y. (5); Iowa, N. Dak., N.J. (8). Based on *Ascospora pseudhimantia* Rehm, a nomen nudum; may include *Laestadia scabiosa* Lambotte & Fautr. as reported on *Aster;* is believed to be the ascigerous stage of *Placosphaeria haydeni* but not fully confirmed.

Entyloma aster-sericeanum Zundel, white smut. Wis. (8).

E. compositarum Farl.—Mass. (2,6); Maine (6); S. Dak., Wis. (8).

Erysiphe cichoracearum DC., powdery mildew. General (*).

Exophoma astericola Tehon, on leaves. Ill. (8).

Gibberidea heliopsidis (Schw.) Shear, black knot. N.Y. (5); N. Dak., Nebr., Wis. (8).

Hendersonia leucelenes Fairm., on stems and leaves. N. Mex. (8).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Heteropatella alpina (Ell. & Ev.) W. B. Cooke, on stems. Calif. (8).

Leptothyrium doellingeriae Dearn. & House, leaf spot. N.Y. (8).

Macrophoma astericola (Atk.) Tassi, on stems and leaves. Ala. (8).

Meloidogyne sp., root knot nematodes. Calif., Conn. (8).

Microdiplodia leucelenes Fairm., on stems and leaves. N. Mex. (8).

Ovularia asteris Solheim, leaf spot. Wyo. (8).

O. virgaurea (Thuem.) Sacc.—Colo., Miss., Wis. (8).

Phoma iowana Sacc., on leaves. Iowa (7), N.H. (8), Wis. (7,8).

Phomopsis brencklei Petr.: SEE *Clypeoporthella brencklei.*

Phyllachora asterigena Ell. & Ev., black leaf spot. Kans., Nebr. (8). SEE ALSO *Discosphaerina* and *Placosphaeria.*

P. haydeni (Berk. & Curt.) Dearn.: SEE *Placosphaeria haydeni.*

Phyllosticta astericola Ell. & Ev., leaf spot. Tex. (1,8); Wis. (8).

Placosphaeria haydeni (Berk. & Curt.) Petr., black spot (tar spot) on leaves, stems, and bracts. Nebr. (3); N.Y. (5); Iowa, Kans., N. Dak., N.J., W. Va., Wis. (8). *P. decipiens* Dearn. & Fairm., N. Mex. (8), may be distinct. Has been reported as *Ophiodothis haydeni* (Berk. & Curt.) Sacc. and *Phyllachora haydeni* (Berk. & Curt.) Dearn., but is usually sterile and bears conidia only. SEE ALSO *Discosphaerina.*

Puccinia asteris Duby (III), rust. Throughout the U. S. (2,3,4,5,6, and many others).

P. extensicola Plowr. var. *asteris* (Thuem.) Arth. (O,I), rust. Reported on (2,4, and many other species), especially in the Northeastern, North Central, and Western States. II and III on *Carex* spp.

P. grindeliae Pk. (III)—Colo., Kans., Nev., Wyo. (8). On *A. canescens* Pursh and *A. tanacetifolius* HBK.

P. stipae Arth. (O,I)—Colo., Iowa, Kans., N. Dak., Nebr., S. Dak. Chiefly on *A. multiflorus* Ait. II and III on *Oryzopsis, Stipa,* and *Koeleria.*

Pyrenophora hispida (Niessl) Sacc., on stems. Calif. (8).

P. leucelenes Fairm., on leaves and stems. N. Mex. (8).

Ramularia asteris (Phil. & Plowr.) Bub., leaf spot. Tex. (4,8); Iowa, Mich., Nebr., Wis. (5,7,8); Wyo. (8).

R. filaris Fres.—Colo., N.H. (8).

R. macrospora Fres. var. *asteris* Trel.—Iowa (5).

R. virgaureae Thuem.—Wis. (4).

Rhytisma spp. Various names mistakenly referred to this genus, as *R. asteris* Schw., *R. astericola* Sacc., and *R. solidaginis* Schw., have been applied to blister galls on leaves of *Aster* spp. caused by gall midges, *Asteromyxia* spp.

Sclerotinia sclerotiorum (Lib.) d By., stem rot. Conn. (8).

Septoria angularis Tharp, leaf spot. Tex. (8).

S. astericola Ell. & Ev.—Del., Mass., Mich., Ohio (2); Wis. (2,8).

S. asterina Tharp—Tex., Wyo. (8).

S. atropurpurea Pk.—Vt. to Md., Iowa. and Wis. (2,4, 5,8); Mich., N.Y., Oreg., Pa., Tex., Wyo. (8).

S. punicei Pk.—Minn., N.Y. (8).

S. shastensis Bonar & W. B. Cooke—Calif. (8).

S. solidaginis Pk.—Ill., Tex., Wis. (8).

Stagonospora herbarum (Cke. & Harkn.) Sacc., on stems. Calif. (8).

Synchytrium nigrescens J. J. Davis, leaf gall. Wis. (8).

Uromyces compactus Pk. (III), rust. Ariz., N. Mex., Tex. (on *A. spinosus* Benth.).

U. junci (Desm.) L.Tul. (O,I)—N.H. (on *A. macrophyllus*). II and III on *Juncus* spp.

Verticillium albo-atrum Reinke & Berth., wilt. Conn. (8).

MOSAIC—unidentified virus. Calif. (8).

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (8).

Baccharis

(1) *B. glutinosa* Pers., seepwillow. Range 5,9, 10,11,16,17.
(2) *B. halimifolia* L., groundsel-bush. Range 17,20,27,28,29,30.
(3) *B. pilularis* DC., kidneywort. Range 1,5.
(4) Other species.

Coarse herbs or shrubs, mostly on dunes and in salt marshes along seacoasts; sometimes grown in hedges and for erosion control; useful to wildlife.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., also the var. *chromogena* Shear et al., on stems. Fla. (4).
Cercospora baccharidis Ell. & Ev., leaf spot. Calif. (1,4).
Diaporthe sarothamni (Auers.) Nits. var. *baccharidis* (Cke.) Wehm., on stems. Ga., N.Y. (2).
Dimeriella melioloides (Berk. & Curt.) Th., black mildew. Fla., S.C. (2).
Eutypella tumidula (Cke. & Pk.) Sacc., on stems. Calif. (?1).
Fomes applanatus (Pers. ex Wallr.) Gill., wood rot. N.Y. (2).
F. conchatus (Pers. ex Fr.) Karst.—N.Y. (2).
Leptosphaeria bicuspidata (Cke. & Harkn.) Berl. & Vogl., on stems. Calif. (3).
Phyllosticta baccharidis Dearn. & House, leaf spot. N.Y. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).
Physalospora abdita (Berk. & Curt.) N. E. Stevens, on stems. S.C. (4).
P. obtusa (Schw.) Cke.—Ga. (2).
P. rhodina (Berk. & Curt.) Cke.—S.C. (4).
Placosphaeria baccharidis Dearn. & House, on stems. N.Y.
Polyporus tulipiferus (Schw.) Overh., wood rot. Md. (2).
Puccinia baccharidis Diet. & Holw. (O,I,II,III), rust. Ariz., Calif. (1,4); N. Mex., Tex. (1).
P. evadens Harkn. (O,I,II,III)—Va. to Fla. and Tex. (2); Calif. (3); Ariz. to Calif. and Utah (4).
P. pistorica Arth. (II,III)—Fla. (4). O and I unknown.
P. ripulae Mains (III)—Tex. (1).
Schizophyllum commune Fr., wood rot. Fla., N.Y. (2).
Septobasidium lepidosaphis Couch, brown felt. Fla. (4).
Sphaeropsis baccharidicola Dearn., on stems. N.Y. (2).
Stagonospora baccharidis Ell., leaf spot. Tex., Va. (4).
Stereum gausapatum Fr., wood rot. Calif. (3); ?Va. (2).
Systremma baccharidis (Cke.) Th. & Syd., black pustule. Fla., Md., N.C., N.Y., Va. (2); Calif. (4).

Balsamorhiza, balsamroot

(1) *B. deltoidea* Nutt.
(2) *B. macrophylla* Nutt.
(3) *B. sagittata* (Pursh) Nutt.
(4) Other species.

Perennial herbs of plains and foothills in the Western States, sometimes grown for ornament; useful to wildlife.

Anguillulina balsamophilus (Thorne) Goodey, leaf gall. Utah (2,3).
Cercosporella herpotrichoides Fron, on roots and stems. Idaho, Oreg., Wash. (4).
Erysiphe cichoracearum DC., powdery mildew. Wyo. (3).
Mycosphaerella balsamorrhizae Earle, on stems. Nev. (4).
Pleospora balsamorrhizae Tracy & Earle, on stems. Colo. (1,3).
Puccinia balsamorhizae Pk. (O,I,II,III), rust. General on the species listed within their respective range, from Mont. to Colo., Calif., and Wash.
Septoria sp., leaf spot. Wash. (1).

Bellis

B. perennis L., English daisy.

European perennial, grown for ornament.

Botrytis cinerea Pers., gray-mold blight. Alaska.
Cercospora sp., leaf spot. Minn.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pythium mastophorum Drechsl., rootlet rot. Md.
Sclerotinia sclerotiorum (Lib.) d By., crown rot. N.J.
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.J., N.Y.

Bidens

(1) *B. pinnata* L., Spanish-needles.
(2) *B. frondosa* L.
(3) *B. laevis* (L.) B.S.P., beggarsticks.
(4) *B. pilosa* L., bur-marigold.
(5) Other species.

Mostly annual weedy herbs, widely distributed in the United States: (4) is sometimes grown for ornament; useful to wildlife.

Cercospora bidentis Tharp, leaf spot. Tex., Wis. (5).
C. megalopotamica Speg.—Wis. (5).
C. umbrata Ell. & Holw.—N.C. to Ind., Tex., and Wis. (2,5).
Entyloma compositarum Farl., white smut. Iowa (2); Kans. (3); N. Mex., Tex. (5).
E. guaraniticum Speg.—Mass., N.J. (2); Fla., P.R. (5).
Erysiphe cichoracearum DC., powdery mildew. Colo., Ind., Mass. (2); Tenn. (5).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T. H. (4).
Phyllosticta decidua Ell. & Kell., on leaves. Wis. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. (5).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Mass. to Ala., Tex., and N. Dak., on various species, especially (2).
Protomyces andinus Lagh., leaf and stem gall. Mass., Wis. (2,5).
Puccinia obtecta Pk. (O,I), rust. Ill., Ind., Iowa, Nebr., N.J., Wis. (2); Colo., Kans., Nebr., N. Mex., Tex., Wis. (5). II and III on *Scirpus* spp.
Pythium oedochilum Drechs., root rot. Md. (5).
Septocylindrium concomitans (Ell. & Holw.) Halst., leaf spot. Ind., Iowa, N.J., Wis. (2); Tex. (3); Iowa, N.C., Wis. (5).
Septoria bidentis Sacc., leaf spot. Mo. (1); Wis. (2).
Sphaerotheca humuli (DC.) Burr., powdery mildew. General (*), especially (2). The var. *fuliginea* (Schlecht.) Salm. also is widespread.
Thecaphora pustulata Clint., stem smut. P.R. (4,5).
Uromyces bidenticola (P. Henn.) Arth. (O,I,II,III), rust. Calif., Fla., N. Mex., P.R., T.H. (4,5).
U. bidentis Lagh. (III)—P.R. (4,5).
MOSAIC—unidentified virus. P.R. (5).
YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (2,4).

Boltonia

(1) *B. asteroides* (L.) L'Her.
(2) *B. diffusa* Ell.

Tall perennials of prairies and plains: (1) in the Eastern and Central States, (2) in Central and Southern States; (1) is cultivated in wild gardens.

Entyloma compositarum Farl., white smut. Wis. (1).
Erysiphe cichoracearum DC., powdery mildew. Nebr., S. Dak. (1).
Guignardia boltoniae Dearn. & Barth., on stems. Okla. (2).
Macrophoma boltoniae Dearn., on stems. Okla. (2).
Puccinia extensicola Plowr. var. *asteris* (Thuem.) Arth. (II,III), rust. Iowa, N. Dak., Nebr., S. Dak. (1). O and I on *Carex* spp.
Septoria erigerontis Berk. & Curt. var. *boltoniae* Webber, leaf spot. Iowa, Wis. (1).
Uromyces compactus Pk. (O,I,II,III), rust. Tex. (2).

Brachycombe

B. iberidifolia Benth., Swan River daisy.

Annual herb of Australia, grown for ornament.

YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif.

Brickellia, brickell-bush

Brickellia spp.

Desert shrubs, chiefly in the Southwestern States.

Aecidium arcularium Arth. (O,I), rust. Ariz., Colo., N. Mex.
Cercospora coleosanthi Ell. & Ev., leaf spot. Calif., Colo.
Coleosporium aridum Jacks. (II), rust. Calif. O,I, and III unknown.
Cuscuta exaltata Engelm., dodder. Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia kuhniae Schw. (O,I,II,III), rust. Ariz., Fla.
P. subdecora Syd. & Holw. (O,I,II,III)—Ariz., Colo., N. Mex., Utah.

Calendula

C. officinalis L., pot marigold.

Annual of southern Europe, widely grown as a garden flower and under glass for cutting.

Alternaria sp., leaf spot (?secondary). N.Y.
Botrytis cinerea Pers. ex Fr., gray-mold blight. Mo., N.J., NY., Alaska.
Cercospora calendulae Sacc., leaf spot. Pa., Tex., Va.
Colletotrichum gloeosporioides Penz., leaf and stem spot. Va.
Entyloma calendulae (Oud.) d By., white smut. Calif., N.H., Oreg.
E. compositarum Farl—Wash.
Erysiphe cichoracearum DC., powdery mildew. Calif., ?N.Y.
E. polygoni DC.—Pa.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Tex., W. Va., T.H.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia flaveriae Jacks. (III), rust. Ill., Ind., Iowa, Kans., Mo., Nebr., Tex.
Pythium ultimum Trow, root rot. Calif.
Rhizoctonia solani Kuehn, stem rot. Ind., N.C., N.J., Tex.
Sclerotinia sclerotiorum (Lib.) dBy., stem rot, wilt. Calif., Fla., La., Mo., Ohio, Tex.
Sclerotium rolfsii Sacc., southern blight. Tex.
MOSAIC—unidentified virus (perhaps cucumber mosaic, *Marmor cucumeris* Holmes). Conn., Iowa, Kans., Minn., Miss., Tex.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Mich., Tex.
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Conn., Del., Maine, N.J., N.Y., Pa., Va. Also var. *californicus* Holmes in Calif.

Callistephus

C. chinensis (L.) Nees, China-aster.

Annual of China and Japan, important garden and cut flower of late summer, with commercial production in the Northeastern and Central States and especially California.

Alternaria sp. (chiefly *A. tenuis* Nees ex Cda.), secondary leaf spot and seed mold. Cosmopolitan.
Ascochyta asteris (Bres.) Gloyer, leaf spot. Calif., N. Dak., N.Y., Ohio.
Basidiophora entospora Roze & Cornu, downy mildew. Fla., Tex.
Botrytis cinerea Pers. ex Fr., gray-mold blight, stem canker. Calif., Conn., Ill., N.J., N.Y., Pa., Wis., Alaska.
Coleosporium solidaginis (Schw.) Thuem. (II,III), rust. General except the Far South. O and I on 2- and 3-needle *Pinus* spp.
Colletotrichum sp. (? *gloeosporioides* Penz.), anthracnose. Fla.
Cuscuta spp., dodder. Reported in Mass. and N.Y., but doubtless widespread.
Diaporthe arctii (Lasch) Nits., on stems. N.J.
Erysiphe cichoracearum DC., powdery mildew. Del., Minn., N.C., Nebr., Vt., Wash.
E. polygoni DC—N.J.
Fusarium oxysporum Schlecht. f. *callistephi* (Beach) Snyd. & Hans. (*F. conglutinans* Wr. var. *callistephi* Beach, *F. orthoceras* Appel & Wr. var. *callistephi* (Beach) Padwick), wilt, stem rot. General. *F. culmorum* (W.G.Sm.) Sacc. (=*F. roseum* Lk. emend Snyd. & Hans.), secondary stem rot, or ?saprophytic. Widespread, following wilt.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Conn., Fla., Tex., Wash.
Phomopsis callistephi Tehon & Daniels, stem canker. Ill., Wis., ?Md. Perhaps the pycnidial stage of *Diaporthe arctii*.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Phytophthora sp., blackleg, foot rot. Md.
P. cryptogea Pethyb. & Laff.—Calif., Ill.
Pleospora herbarum (Pers. ex Fr.) Rab., seed mold. Cosmopolitan.
Pythium ultimum Trow, root rot. Calif., N. Dak.
Rhizoctonia solani Kuehn, root and stem rot. Widespread, chiefly in the Northeastern and North Central States; leaf blight also reported in N.J.
Sclerotium rolfsii Sacc., southern blight. Miss., N.C.
Septoria callistephi Gloyer, leaf spot. Ala., Del., Ill., Mich., Mo., N.J., N.Y., Ohio, Pa.
Verticillium sp. (? *albo-atrum* Reinke & Berth.), wilt. Calif., Conn., Ill., Mass., N.Y.
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Oreg.

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif.
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). General. Also var. *californicus* Holmes, Callistephus virus 1A K.M. Sm., in Calif., Colo., Idaho, Oreg., Utah, Wash.

Carthamus

C. tinctorius L., safflower.

Annual of southern Asia; grown for ornament in the United States, elsewhere as source of red dye and for oil-containing seed.

Alternaria sp., leaf spot. Ind., Nebr.
Gloeosporium carthami (Fukui) Hori & Hemmi, anthracnose, blight. Ind., S. Dak., Tex., Va.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla.
Phoma sp., on leaves. Ind.
Puccinia carthami Cda. (II,III), rust. Mass., Nebr., (? Colo., Mont., N. Dak.). O produced on same host experimentally.
Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. Ind., N. Dak., Va.
Septoria carthami Murashkinsky, leaf spot. Ind., Tex.

Centaurea

(1) *C. americana* Nutt., basketflower.
(2) *C. cyanus* L., cornflower, bachelors-button.
(3) *C. cineraria* L., dusty-miller.
(4) *C. montana* L., mountain-bluet.
(5) Other species.

Annual (1,2) or perennial (3,4) herbs: (1) indigenous to the lower Mississippi Valley, the others introduced from Europe and (2) widely escaped; the exotic species grown for ornament.

Albugo tragopogonis Pers. ex S. F. Gray, white-rust. Tex. (5).
Bremia lactucae Regel, downy mildew. Calif. (2). See note under *Lactuca*.
Cuscuta sp., dodder. Tex. (1).
Erysiphe cichoracearum DC., powdery mildew. Calif. (1,5), Conn. (3).
Fusarium oxysporum Schlecht. ? f. *callistephi* (Beach) Snyd. & Hans., stem rot, wilt. Mich. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif., Fla. (2); Ohio (5).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,5).
Phytophthora cactorum (Leb. & Cohn) Schroet., stem rot. N.Y. (1,2).
Plasmopara halstedii (Farl.) Berl. & De T., downy mildew. Iowa, Tex. (5).
Puccinia cyani (Schleich.) Pass. (O,I,III), rust. Mass. to N.C. and Ind., also Calif., Oreg., Wash. (2); Md., Tex. (5).
P. irrequisita Jacks. (II,III)—Tex. (1) O and I unknown.
Pythium sp., root rot. N.J. (2).
Rhizoctonia solani Kuehn, root and stem rot. Ind., N.J., N.Y., Tex. (2); Ill., Tex. (5).
Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. Miss., Mo. (2); Ind. (4); Calif., Miss., Tex. (5).
Sclerotium rolfsii Sacc., southern blight. Conn., Md., Tex. (2); N.J. (5).
Septoria sp., on leaves and stems. Oreg. (2).
S. centaureicola Brun. var. *brevispora* Pk.—N.Y. (2).
Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (2).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Pa. (5). Also var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.—Calif. (1,2).

Chrysanthemum

I. Florists' Chrysanthemums

C. morifolium (Ramat.) Hemsl. (*C. sinense* Sabine, *C. hortorum* Bailey, *C. indicum* L. in part but not typically.)

Cultigen of Chinese origin, long cultivated in gardens as a perennial and widely in greenhouses as a cut flower; some garden types now include *C. coreanum* Hort.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Conn., N.J., Tex.
Alternaria sp., leaf spot (? secondary). Okla., Tex. *A. tenuis* Nees ex Cda. occurs commonly on leaves attacked by nematodes and *Septoria*.
Aphelenchoides ritzema-bosi (Schwartz) Steiner & Buhrer, leaf nematode. Reported in Conn., Ind., Md., N.J., N.Y., Ohio, Pa., Tex., and Wash., but probably more widely distributed.
Ascochyta chrysanthemi F. L. Stev.: SEE *Mycosphaerella ligulicola*.
Botrytis cinerea Pers. ex Fr., gray-mold blight of flowers and buds, also leaves and stems of cuttings. Cosmopolitan.
Cercospora chrysanthemi Heald & Wolf, leaf spot. Ala., La., Md., Pa., Tex.
Corynebacterium fascians (Tilford) Dows., fasciation. Calif., Mich., N.J., N.Y., Ohio.
Cuscuta sp., dodder. Mich., N.J., N.Y., Wash., W. Va. *C. arvensis* Beyrich and *C. indecora* Choisy—Tex.
Cylindrosporium chrysanthemi Ell. & Dearn., leaf spot. Mass. to Ala. and Kans. By some authors said to be identical with *Septoria chrysanthemella* Sacc. (q.v.); by others mantained as distinct.
Erwinia carotovora (L. R. Jones) Holland, bacterial stem rot. Okla.
Erysiphe cichoracearum DC. (*Oidium chrysanthemi* Rab.), powdery mildew. General.
Fusarium sp., root and stem rot, wilt (? secondary). Ala., Fla., Ill., N.H., N.J., Ohio, Okla., Tex., Va.
F. oxysporum Schlecht. f. *callistephi* Snyd. & Hans., wilt. Okla.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophomina phaseoli (Maubl.) Ashby, charcoal stem rot. Okla.
Meloidogyne sp., root knot nematodes. N.J. to Fla., Tex,. and Kans.; Calif., Wash.
Mycosphaerella ligulicola K. F. Baker, Dimock, & L. H. Davis, ray blight, stem canker. Md. to Fla., Miss., and Ohio; Calif.
Phyllosticta chrysanthemi Ell. & Dearn., leaf spot. Fla., Mass., Miss., Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Pratylenchus pratensis (De Man) Filip., root nematode. N.J., Tex.
Puccinia chrysanthemi Roze (II), rust. General. The telial stage is known only in Japan; O and I unknown.
Pythium sp., root rot. N. Dak., Tenn., Tex.
P. ultimum Trow—Md.
Rhizoctonia solani Kuehn, root and stem rot. General.
Sclerotinia sclerotiorum (Lib.) d By., stem rot, drop. Ariz., Mich., Va. Blossom rot—La.
Sclerotium rolfsii Sacc., southern blight. Fla., Va.
Septoria chrysanthemi Allesch., leaf spot. Reported throughout the Eastern and Central States to Fla. and Tex., also Colo. and Calif.; probably often con-

fused with *S. leucanthemi*. The following names used in reports, appear to be synonyms: *S. chrysanthemi* Cav., *S. chrysanthemella* Sacc., *S. rostrupii* Sacc. & Syd., *S. chrysanthemi-indici* Kab. & Bub.

S. leucanthemi Sacc. & Speg., leaf blotch, leaf blight. Specific reports under the names, regarded as synonyms, *S. cercosporoides* Trail, *S. macrosporia* Dearn., and *S. obesa* Syd. Reported only in Conn., Md., N.J., N.Y., Tex., Wash., but probably as widespread as *S. chrysanthemi*, and often confused with it.

Verticillium albo-atrum Reinke & Bert., wilt. Ill., Ind., Mass., Md., Mich., Minn., N.J., N.Y., Ohio, Pa., Wash. In some varieties a typical wilt does not occur, but general stunting, tip blight, and sometimes leaf spot.

CRACK-NECK—physiological, attributed to overwatering and deficient ventilation. Occasional in greenhouses.

DWARF—suspected virus. Wash.

MOSAIC—unidentified virus. Calif., Colo., Md., N.J., Ohio.

SPOTTED WILT — virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Wash.

STUNT—unidentified virus. Eastern States and Pacific Northwest, probably coextensive with greenhouse chrysanthemum culture. In California a *Deuterophoma* sp. (collected also in Ill. and Ohio) has been associated with the disease but its etiological relation not established.

YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.), Conn., Mich., Miss., N.J., N.Y., Ohio.

II. Miscellaneous Species

(1) *C. carinatum* L., tricolor crysanthemum.
(2) *C. coronarium* L., garland crysanthemum.
(3) *C. segetum* L., corn-marigold.
(4) *C. cinerariifolium* (Trev.) Vis., Dalmatian pyrethrum.
(5) *C. coccineum* Willd., common pyrethrum.
(6) *C. frutescens* L., marguerite.
(7) *C. leucanthemum* L., especially the var. *pinnatifidum* Lecoq. & Lamotte, oxeye daisy.
(8) *C. maximum* Ramond, Shasta daisy.
(9) *C. parthenium* (L.) Bernh., feverfew.

Annual (1,2,3) or perennial (4–9) herbs of Old World origin; cultivated in the United States chiefly for ornament, (5) abroad also as source of pyrethrum; several occasionally escaped and (7) widely naturalized and a troublesome weed in the Northeast.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Iowa, Md., N.J., N.Y., Va., Wash., Alaska (6).

Botrytis cinerea Pers. ex Fr., gray-mold blight. Pa. (5).

Cercospora chrysanthemi Heald & Wolf, leaf spot. Okla. (8).

Corynebacterium fascians (Tilford) Dows., fasciation. Conn., Md. (5); Calif. (8).

Cylindrosporium chrysanthemi Ell. & Dearn., leaf spot. Tex. (7).

Diaporthe arctii (Lasch) Nits., on stems. Ga. (6).

Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (7).

Erysiphe cichoracearum DC., powdery mildew. N.J. (6), N.Y. (9).

Fusarium roseum Lk. emend Snyd. & Hans. and *F. solani* (Mart.) Appel & Wr., stem rot. Tex. (7,8).

Gloeosporium sp., damping-off. Pa. (5).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Fla., Md., Miss., Ohio, Tex., Wash. (2,4,5,6,7,8).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4,7).

Pythium sp., root rot. Colo. (5), N.J. (8).

Rhizoctonia solani Kuehn, root and stem rot. N.J. (5); Md. (8); Wash. (9); P.R. (4).

Sclerotinia sclerotiorum (Lib.) d By., stem rot, drop. Va. (5); Tex. (7); Mont., Wash. (8).

Sclerotium rolfsii Sacc., southern blight. Tex. (7).

Septoria chrysanthemi Allesch. (*?S. chrysanthemella* Sacc.), leaf spot. N.Y. (3,7); Conn., Iowa, Tex., Vt., Wis. (7).

S. leucanthemi Sacc. & Speg. (*?S. cercosporoides* Trail, *S. macrosporia* Dearn.), leaf blotch. Conn., N.Y. (7); Calif., Oreg. (8).

Verticillium albo-atrum Reinke & Berth., wilt. N.J. (6).

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (2,6).

YELLOW DWARF—virus (*Marmor vastans* Holmes = *Aureogenus vastans* (Holmes) Black, Solanum virus 16 K.M.Sm.). N.Y. (7).

YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.Y. (4,6,7); Kans., N.J. (7). Also var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.—Calif. (1,3,6).

Chrysopsis, golden-aster

Chrysopsis spp.

Mostly perennial herbs of dry plains and woodlands, widely distributed in the United States; some are grown in wild gardens, some useful to wildlife.

Cercospora macroguttata Atk., leaf spot. Ala., Miss.

Coleosporium solidaginis (Schw.) Thuem. (II,III), rust. Colo., Fla., Nebr. O and I on *Pinus* spp.

Erysiphe cichoracearum DC., powdery mildew. Mont., Wyo.

Puccinia grindeliae Pk. (III), rust. Calif., Colo., Okla., Utah, Wyo.

P. stipae Arth. (O,I).—Ariz., Colo., Fla., Mont., Nebr., Wyo. II and III on *Oryzopsis* and *Stipa*.

Ramularia chrysopsidis Dearn., leaf spot. N.Y.

Chrysothamnus, rabbitbrush

(1) *C. nauseosus* (Pallas) Britton, rubber rabbitbrush. Range 4,6,7,8,9,11,12,13,14,15.
(2) *C. viscidiflorus* (Hook.) Nutt., Douglas rabbitbrush. Range 4,5,6,7,8,9,10,11,12,13, 15.
(3) Other species.

Small to large shrubs of arid plains, potential rubber plants, especially (1); some are minor forage plants; useful to wildlife.

Camarosporium rosellinioides Ell. & Ev., on stems. Colo. (3).

Clasterosporium pulvinatum Ell. & Ev., on stems. Colo. (3).

Cucurbitaria umbilicata Ell., on stems. N. Dak. (1).

Cylindrocolla bigeloviae Ell. & Ev., on stems. Colo. (3).

Dothidea bigeloviae Ell. & Ev., on stems. Mont. (3).

Epochnium isthmophorum Sacc., on stems. Nev., Utah, Wash. (1).

Erysiphe cichoracearum DC., powdery mildew. Mont., N. Mex., Wyo. (2); Calif. (3).
E. polygoni DC. var. *sepulta* (Ell. & Ev.) Salm.—Colo., Mont., Utah, Wyo. (1,3).
Gibberidea arthrophyma Fairm., on stems. N. Mex. (1).
Melanomma occidentale (Ell.) Sacc., on stems. N. Dak. (1).
Phleospora bigeloviae Ell., leaf spot. Calif. (3).
Puccinia extensicola Plowr. var. *solidaginis* (Schw.) Arth. (O,I), rust. N. Mex. (3). II and III on *Carex* spp.
P. stipae Arth. (O,I)—Colo., Mont., Wash., Wyo. (1,2). II and III on *Stipa* spp. and other grasses.
P. grindeliae Pk. (III, sometimes O)—Ariz., Colo., Mont., Nev., N. Mex., Utah, Wyo. (*). Correlated with *P. stipae*.
Rosellinia bigeloviae Ell. & Ev., on stems. Colo., N. Mex. (1).
R. ovalis (Ell.) Sacc.—N. Dak. (1).
Syncarpella tumefaciens (Ell. & Harkn.) Th. & Syd., on stems, ? gall. Colo., N. Mex. (1); Calif. (3).
Thecaphora piluliformis Berk. & Curt., inflorescence smut. Ariz. (3).
Thyrostroma utahense (Sacc.) Petr., on stems. Utah (1,3).
Trematosphaeria chrysanthemi Earle, on stems. Colo. (3).

Cichorium

(1) *C. endivia* L., endive, escarole.

Annual or biennial herb, probably of India, cultivated as a salad plant.

(2) *C. intybus* L., chicory.

Perennial herb of Europe, cultivated for roots, which are used as a coffee substitute, and for esculent leaves, also widely naturalized.

Alternaria sp., leaf spot (?secondary). Fla. (1,2); Conn., N.Y. (1); Wis. (2).
Botrytis cinerea Pers. ex Fr., gray-mold rot. Calif., Fla., N.Y., Pa. (1).
Bremia lactucae Regel, downy mildew. Fla., Pa. (2). See note under *Lactuca*.
Cercospora cichorii J.J.Davis, leaf spot. Tex. (1,2); Mich., N.Y., Wis. (2).
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. Mass., N.Y., Tex. (1); Calif. (2).
Erysiphe cichoracearum d By., powdery mildew. Idaho, N.J. (2).
Fuligo septica (L.) Weber, slime mold. N.J.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Marssonina panattoniana (Berl.) Magn., leaf spot. Tex. (1).
Meloidogyne sp., root knot nematodes. Tenn. (1), Mass. (2).
Phoma sp. (*?P. albicans* Rob. ex Desm.), root rot. N.Y. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz. (1); Tex. (1,2).
Pseudomonas cichorii (D.B.Swing.) Stapp, and *P. intybi* (D.B.Swing.) Stapp, center rot. Mont. (1,2). Bacterial rot attributed to unnamed organisms is reported also in Ariz., Fla., Tex., and Wash.
Puccinia hieracii (Schum.) Mart. (O,I,II,III), rust. Calif., Conn., Mass., N.Y. (1); Calif., Conn., N.Y., Oreg., Pa., Vt., Wash., Wis. (2).
Pythium debaryanum Hesse, root rot. Conn., Fla. (1).
Ramularia cichorii Dearn. & House, leaf spot. N.Y. (2).
Rhizoctonia solani Kuehn, bottom rot, damping-off. Conn., Fla., N.Y. (1); Tex. (1,2).
Sclerotinia sclerotiorum (Lib.) d By., watery soft rot, drop. Ariz., Ark., Calif., Fla., Ga., La., Mont., Pa., Tex. (1); Tex., Wash. (2).
Sclerotium rolfsii Sacc., southern blight. Fla., Tex. (1, 2).
MOSAIC—unidentified virus. Fla. (1).
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (1,2).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Colo., Ill., ?Ind., N.J., N.Y., Tex., Wis. (1); Ind., N.Y., Tex. (2). Also var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.—Calif. (1,2).
BROWN HEART, CANKER—in part, boron deficiency. N.J., N.Y. (1); Tex. (2). Perhaps in part bacterial.
TIPBURN—physiological, attributed to high temperature and excessive transpiration. Ariz., N.Y. (1); Calif. (2).

Cirsium, thistle

(1) *C. altissimum* (L.) Spreng.
(2) *C. discolor* (Muhl.) Spreng.
(3) *C. lanceolatum* (L.) Hill
(4) *C. muticum* Michx.
(5) *C. occidentale* (Nutt.) Jepson
(6) *C. undulatum* (Nutt.) Spreng.
(7) *C. arvense* (L.) Scop., Canada thistle.
(8) Other species.

Coarse biennial or perennial herbs, mostly in waste ground, endemic in the Eastern and Central States (1,2,4) or in the West (5,6), or naturalized from Europe and troublesome weeds (3,7); some of the introduced species are grown for ornament; several are useful to wildlife.

Aganthostigma occidentale (Ell. & Ev.) Sacc., on leaves. Ill., Iowa (1,2); Wis. (2).
Albugo tragopogonis Pers. ex S.F.Gray, white-rust. Mich. (1); Wis. (3); Mich., Minn., N.Y., Ohio, Wis. (4); Tex. (6); N.Y. to Iowa, Tex., and Wyo. (7); La. (8).
Cercospora spp., leaf spot: *C. cirsii* Ell. & Ev.—Wash. (8); *C. ditissima* Ell. & Ev. and *C. obesa* Ell. & Ev.—Kans. (6); *C. kansensis* Syd.—Kans., Tex. (1).
Cuscuta sp., dodder. N.Y. (7).
Diaporthe arctii (Lasch) Nits., on stems. Ga. (1).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. (3).
Erysiphe cichoracearum DC., powdery mildew. General, except not reported on (5), rare on (7) but reported in Tex.
Fusarium sp., wilt. Wash. (7).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Kans., Ohio (7).
Ophiobolus acuminatus (Sow. ex Fr.) Duby, on stems. Kans., Mich. (1); N.Y. (3); N. Dak. (8).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Wash. (3).
Phyllosticta cirsii Desm., leaf spot. Wash. (6), N.Y. (7), Wis. (8).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3,6,7).
Physalospora obtusa (Schw.) Cke., on stems. Ga. (1).
Puccinia cirsii Lasch (O,I,II,III), rust. On all species listed except (7) and on numerous others, from Pa. to N.C., Tex., Calif., and Oreg.
P. obtegens (Lk.) Tul. (*P. suaveolens* (Pers.) Rab.) (O,I,II,III), rust. Maine to N.J., Ohio, and west to Calif. and Wash. (7).

Rhizoctonia solani Kuehn, root rot. Ill. (8).
Sclerotinia sclerotiorum (Lib.) d By., crown rot. Colo., Mont., Oreg. (7).
Sclerotium rolfsii Sacc., southern blight. Tex. (3,7).
Septoria cirsii Niessl (*S. commonsii* Ell. & Ev.), leaf spot. Del., Ind., Kans. (1); Ill., Wis. (2,3); Iowa (2,8); Mich., N.Y., Wis. (4); Vt. to Ind., Tex., and Wis. (7).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Md. (8).
Stagonospora cirsii J. J. Davis, leaf spot. Wis. (1).
Thecaphora trailii Cke., inflorescence smut. Colo., Utah (8).
Uromyces junci (Desm.) Tul. (O,I), rust. Mont., N. Dak., Nebr. (8). II and III on *Juncus* spp.

Cnicus

C. benedictus L., blessedthistle.

Annual herb of southern Europe, cultivated for ornament and as a drug plant.

Sclerotium rolfsii Sacc., southern blight. Ga.

Coreopsis, tickseed

(1) *C. grandiflora* Nutt.
(2) *C. lanceolata* L.
(3) *C. tinctoria* Nutt.
(4) Other species.

Annual (3) or perennial (1,2) herbs, endemic and widely distributed in North America; improved forms are cultivated for ornament.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska (1).
Cercospora coreopsidis Ray, leaf spot. Okla. (1).
Coleosporium inconspicuum (Long) Hedgc. & Long (II, III), rust. N.C. (1,2,3); Tenn. (2,3); Ga., Md., Ohio, S.C., Va., W. Va. (3). O and I on *Pinus* spp.
Cuscuta sp., dodder. N.J. (3).
Erysiphe cichoracearum DC., powdery mildew. N.Y. (1); Md., Minn., Wis. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla. (3,4).
Phyllosticta coreopsidis Greene, leaf spot. Wis. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).
Rhizoctonia solani Kuehn, root and stem rot. N.Y. (2); Minn. (3); Tex. (3,4).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Ohio, Wash. (1,3).
Sclerotium rolfsii Sacc., southern blight. Fla. (2), Tex. (3).
Septoria coreopsidis J. J. Davis, leaf spot. Iowa, Wis. (3); Tex. (4).
Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (2).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (3).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.J., N.Y. (2,3). Also var. *californicus* Holmes—Calif. (3).

Cosmos

(1) *C. bipinnatus* Cav., common cosmos.
(2) *C. sulphureus* Cav., yellow cosmos.
(3) *C. caudatus* H.B.K.

Annual herbs of Mexico, cultivated for ornament, especially (1) and (2).

Cercospora sp., leaf spot. Tex. (1).
Cuscuta sp., dodder. N.Y. (1).
Diaporthe stewartii Harrison, stem canker, blight. Conn. to N.J., Kans., and S. Dak.; Calif. (1); Tex. (1,2).
Erysiphe cichoracearum DC., powdery mildew. Calif., Iowa, Md., N.C., Nebr. (1); Tex. (1,2); P.R. (3).
Fusarium sp., wilt. N.J. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla. (1), Md. (2).
Phomopsis stewartii Pk.: SEE *Diaporthe stewartii*.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (1,2).
Pseudomonas solanacearum E.F.Sm., bacterial wilt. N.C. (1); P.R. (3).
Pythium sp., root rot. Md. (1).
Rhizoctonia solani Kuehn, root and stem rot. Conn., Md., (1); Tex. (1,2).
Sclerotium rolfsii Sacc., southern blight. Miss. (1).
Septoria sp., leaf spot. Conn. (1).
Sphaerotheca humuli (DC.) Burr., powdery mildew. P.R. (2).
Uromyces bidentis Lagh. (III), rust. P.R. (3).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1).
MOSAIC—unidentified virus. Fla., Tex. (1).
SPOTTED WILT — virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Reported as leaf scorch in Tex. (1,2).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Del., N.J., N.Y. (1). Also var. *californicus* Holmes—Calif. (1).

Crepis, hawksbeard

(1) *C. acuminata* Nutt.
(2) *C. occidentalis* Nutt.
(3) *C. runcinata* (James) Torr. & Gray.
(4) Other species.

Numerous annual or perennial herbs, native or introduced on prairies, plains, and waste land in the Eastern, Central, and Western States; some are useful to wildlife; a few may be grown for ornament.

Cercospora stromatis Clements, leaf spot. Colo. (1).
Erysiphe cichoracearum DC., powdery mildew. Pa. (3); Nebr. (4).
Phyllosticta eximia Bub., leaf spot. Colo. (1).
Puccinia crepidis-montanae (Syd.) Magn. (O,I,II,III), rust. Wyo. (1); Colo. (3,4); Mont. (2); Idaho, Oreg., Utah, Wash. (4).
P. extensicola Plowr. var. *hieraciata* (Schw.) Arth. (O,I), rust. Mont., Nebr. (3,4); Nev., Wash. (4). II and III on *Carex* spp.
P. hieracii (Schum.) Mart. (O,I,II,III), rust. N. Dak. to Colo., Calif., and Wash. (*).
P. stipae Arth. (O,I), rust. Mont. (1); Utah, Wash. (4). II and III on *Stipa* spp. and other grasses.
Ramularia crepidis Ell. & Ev., leaf spot. N. Mex. (4).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Wyo. (3).

Cynara

(1) *C. cardunculus* L., cardoon.
(2) *C. scolymus* L., artichoke (globe artichoke).

Coarse perennial herbs of southern Europe: (1) cultivated for edible roots, (2) for the edible receptacle and bracts of the young in-

florescence; commercial cultivation chiefly in California and Texas.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Calif., N.Y. (2).
Cercospora obscura Heald & Wolf, leaf spot. Calif., Tex. (1,2).
Cladosporium sp., secondary leaf spot. Calif., S.C. (2).
Erysiphe cichoracearum DC., powdery mildew. Calif. (1,2), ?N.J. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Phytophthora megasperma Drechs., root rot. Calif. (2).
Ramularia cynarae Sacc., leaf spot. Calif. (1,2).
Rhizoctonia solani Kuehn, root and stem rot. Miss., Tex. (2).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Oreg. (2).
Sclerotium rolfsii Sacc., southern blight. Ga., Tex. (2).
YELLOWS—unidentified virus. Calif. (2).

Dahlia

D. variabilis (Willd.) Desf., dahlia.

Cultigen, perennial by tuberous roots, derived chiefly from *D. pinnata* Cav. and *D. coccinea* Cav., and also *D. juarezii* Hort., cactus dahlia; originally of Mexico and Guatemala, now widely cultivated as a garden flower and for cutting.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Conn., Ill.
Alternaria sp. (*?A. tenuis* Nees ex Cda.), leaf spot. Vt. to Ala., Mo., and Mich.; Wash. Probably secondary, following hopperburn and other foliage injuries.
Aphelenchoides ritzema-bosi (Schwartz) Steiner & Buhrer, leaf nematode. Calif.
Armillaria mellea Vahl ex Fr., root rot. Calif.
Botrytis cinerea Pers. ex Fr., gray-mold blight of buds and flowers, storage rot of tubers. Cosmopolitan.
Cercospora sp., leaf spot. Fla., Miss.
Choanephora americana Moell., blossom blight. Fla.
Entyloma dahliae Syd., leaf smut. Calif., N.J., Oreg. In Europe often reported as *E. calendulae* (Oud.) d By., and perhaps only a synonym of this.
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot of stems. Miss., ?Wash.
E. cytolptica Chester, bacterial rot of stems and tubers. N.Y. SEE ALSO *Pseudomonas solanacearum.*
Erysiphe cichoracearum DC., powdery mildew. General.
E. polygoni DC. Calif., Del., Ga., Iowa, Mo., N.J., Pa., Va.
Fusarium spp., wilt, root and stem rot. Ariz., Md., Mo., N.H., N.J., N.Y., Ohio. Specific identification lacking but *F. oxysporum*-type reported associated with wilt, *F. roseum*-type with tuber rot. Fusarium head blight, reported in Pa.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. Okla., S.C.
Meloidogyne sp., root knot nematodes. N.C. to Ala., Tex., and Mo.; Ariz., Calif.
Mycosphaerella dahliae (Cke. & Ell.) Coons, on stems. Mich., N.J., Vt.
Phoma dahliae Berk., on leaves (secondary following hopperburn?) N.J., Ohio. Also reported as *Phyllosticta* sp. in N.J.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on stems. Tex.
Pseudomonas solanacearum E.F.Sm., bacterial wilt. Del., Mich., Miss., N.C., N.J., Okla., Tex. Bacterial wilt, unidentified but probably this, also reported in Md. and Ohio.
Pythium spp., root and stem rot of cuttings, watery rot of tubers: *P. debaryanum* Hesse—Conn., Md., Wash.; *P. oedochilum* Drechs. and *P. ultimum* Trow—Md.
Rhizoctonia solani Kuehn, stem rot. Md., Miss., N.C., N.J., Tex., Wash.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Calif., Maine, N.Y.
Sclerotium rolfsii Sacc., southern blight. Fla., Kans., Miss., N.C., N.J., Tex.
Streptomyces scabies (Thaxt.) Waks. & Henrici, scab. N.C.
Uncinula sp., powdery mildew. N.C.
Verticillium albo-atrum Reinke & Berth., wilt. Ill., Mich., Mo., N.J., Ohio, Tex.
MOSAIC, STUNT—virus (*Marmor dahliae* Holmes, Dahlia virus 1 K.M.Sm.). General.
RING SPOT, SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Mich., N.J., N.Y., Tex., Wis.
STREAK—suspected virus. ?N.Y.
YELLOWS — virus (*?Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Md.
HOPPERBURN—leaf scorch and chlorosis caused by *Empoasca fabae* Harris, a concomitant factor in stunt. N.Y. to Md., Mo., and Wis.

Dimorphotheca

(1) *D. annua* Less.
(2) *D. aurantiaca* DC., cape-marigold.

Annual or perennial herbs of South Africa, grown as garden flowers.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Conn., Alaska (1,2).
Fusarium sp., wilt. Fla. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla. (2).
Puccinia flaveriae Jacks. (III), rust. Ill., N.J. (2); Ind. and Nebr. (on *D. cuneata* (Thunb.) DC.).
Pythium ultimum Trow, root rot. Calif. (2).
Rhizoctonia solani Kuehn, root rot. Ill.
Verticillium albo-atrum Reinke & Berth., wilt. Iowa, ?N.Y. (2).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.J., N.Y. (2).

Doronicum

(1) *D. plantagineum* L., leopardsbane.
(2) Other species.

Perennial herbs of southern Europe, grown as garden plants.

Erysiphe cichoracearum DC., powdery mildew. Calif. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif., Md. (1,2).

Echinacea

E. purpurea (L.) Moench, purple-coneflower.

Hardy perennial herb of the Eastern and South Central States, grown as a garden flower.

Cercospora rudbeckii Pk., leaf spot. Iowa.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Septoria lepachydis Ell. & Ev., leaf spot. Wis.
MOSAIC—unidentified virus. N.Y.

Echinops

Echinops sp., globethistle.

Coarse perennial herb of Europe, sometimes grown in wild gardens.

Sclerotium rolfsii Sacc., crown rot. Conn.

Emilia

(1) *E. sagittata* DC., tasselflower.
(2) *E. sonchifolia* DC., Floras-paintbrush.

Annual herbs, widely distributed in tropical regions, and commonly grown as garden flowers.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H. (1,2).
Pratylenchus pratensis (De Man) Filip., root nematode. T.H. (1,2).
Puccinia emiliae P. Henn. (III), rust. Fla. (1,2); P.R., V.I. (2).
Sclerotium rolfsii Sacc., stem rot. T.H. (2).
MOSAIC — virus. In part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm., Fla. (1); in part unidentified, T.H. (2). Experimental infection with tobacco mosaic virus also is reported.
SPOTTED WILT, YELLOW SPOT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (1), T.H. (2).

Encelia

Encelia spp.

Subshrubs of Arizona and California, sometimes grown for ornament.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif.
Puccinia enceliae Diet. & Holw. (O,I,II,III), rust. Calif.

Engelmannia

E. pinnatifida Torr. & Gray, Engelmann daisy.

Perennial herb of the Southwestern Plains, sometimes grown in gardens.

Synchytrium taraxaci d By. & Wor., leaf gall. Tex.

Erechtites

(1) *E. hieracifolia* (L.) Raf., fireweed.

Coarse annual growing on waste ground, and in woodlands after fires, throughout the United States; useful to wildlife.

(2) *E. valerianifolia* DC.

Annual herb of Brazil, adventive in Hawaii.

Bremia lactucae Regel, downy mildew. Pa. (1). See note under *Lactuca*.
Cercospora erechtitis Atk., leaf spot. Ala., Fla., Tex. (1).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (1).
Erysiphe cichoracearum DC., powdery mildew. Md. (1).
E. polygoni DC.—N.Y. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H. (1,2).
Phyllosticta erechtitis F.L.Stevens & E.Young, leaf spot. T.H. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Ill., Mass., Md., N.J., Tex., Wis. (1).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Fla. (1).
Sclerotium rolfsii Sacc., stem rot. Fla. (1).
Septoria erechtitis Ell. & Ev., leaf spot. Del., Tex., Wis., Alaska (1).
Sphaerotheca humuli (DC.) Burr., powdery mildew. N.J. to Ala., Ill., and Minn.; Mont. Also var. *fuliginea* (Schlecht.) Salm.—Iowa, Mich., Pa., Wis. (1).
YELLOW SPOT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). T.H. (2).

Erigeron

I. Annual Species

(1) *Erigeron annuus* (L.) Pers., daisy fleabane.
(2) *E. canadensis* L., horseweed.
(3) *E. strigosus* Muhl.

Widely distributed native plants, of minor importance as weeds.

Basidiophora entospora Roze & Cornu, downy mildew. Ind. (1); Tex. (1,2); Ill. (2,3); Mo., N.C., Wis. (3).
Cercospora cana Sacc., leaf spot. Eastern and Central States to Miss., Tex., and Nebr. (*). *C. griseëla* Pk., reported in Ill., Iowa, Mich., N.Y., and Tex., is doubtfully distinct.
Cuscuta cuspidata Engelm., dodder. Okla. (2).
Diaporthe arctii (Lasch) Nits., on stems. N.J. (1,2).
Diaporthopsis apiculosa (Ell.) Wehm., on stems. N.J. (2).
Dimeriella erigeronicola F.L.Stevens, black mildew. P.R. (2).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (2).
Erysiphe cichoracearum DC., powdery mildew. Md. (1); Tex. (1,2); Mont. (2,3), N.C. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Leptothyrium punctiforme Berk. & Curt., on leaves. N.Y. (1); Wis. (1,3); W. Va. (3).
L. dearnessii Bub. Tex. (1,2).
Macrophomina phaseoli (Maubl.) Ashby, charcoal stem rot. Ill. (2).
Meloidogyne sp., root knot nematodes. T.H. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Iowa, Wis. (1); Tex. (1,2).
Puccinia cyperi Arth. (O,I), rust. N.Y. to Md., Tex., and Wis. (1,2,3). II and III on *Cyperus* spp.
P. extensicola Plowr. var. *erigerontis* Arth. (O,I)—Mass. to Miss., Tex., and S. Dak. (1,2,3). II and III on *Carex* spp.
Ramularia macrospora Fres., leaf spot. Ill., Md., N.J., N.C., Tenn. (1); Tex. (1,2).
Sclerotium rolfsii Sacc., southern blight. Fla. (2).
Septoria erigerontis (*erigeronis*) Pk., leaf spot. N.Y. to Miss., Tex., and Wis. (*).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Pa. (1); Iowa, Md., Mont. (2). Var. *fuliginea* (Schlecht.) Salm.—Mich., Pa. (1); Iowa (2).

MOSAIC—unidentified virus. Tex. (2).
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). T.H. (2).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.Y. to Ga., Okla., and Kans. (*). Also var. *californicus* Holmes, Calif. (2).

II. Perennial Species

(1) *Erigeron glabellus* Nutt.
(2) *E. philadelphicus* L.
(3) *E. pulchellus* Michx.
(4) *E. salsuginosus* A. Gray
(5) *E. speciosus* DC.
(6) Other species.

Native herbs of the Eastern and Central States (1,2,3) or the Far West (4,5); sometimes grown in wild gardens or cultivated, especially (5).

Basidiophora entospora Roze & Cornu, downy mildew. La. (2), Ill. (6).
Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska (6).
Cercospora cana Sacc. (? *C. virgaureae* Thuem.), leaf spot. La. (2); P.R. (6).
Cercosporella colubrina Ell. & Ev., leaf spot. Wash. (4).
Coleosporium solidaginis (Schw.) Thuem. (II,III), rust. Calif., Alaska (6). O and I on *Pinus* spp.
Diaporthe arctii (Lasch) Nits., on stems. N.J. (6).
Dimeriella erigeronicola F.L.Stevens, black mildew. P.R. (6).
Entyloma compositarum Farl., white smut. Mich., N. Dak., Wis. (2); Wash., Wyo. (4); Ill., Utah, Wash. (6).
Erysiphe cichoracearum DC., powdery mildew. Mont. (1,6); Colo., Mich., N. Mex., Pa., S. Dak., Wyo. (6).
Leptothyrium punctiforme Berk. & Curt., on leaves. N.Y. (2).
Mycosphaerella sp. (*Sphaerella subcongregata* Ell. & Ev.), on stems. Wash. (4).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Wash. (6).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Md. (2), Iowa (6).
Puccinia cyperi Arth. (O,I), rust. Mo. (3). II and III on *Cyperus* spp.
P. extensicola Plowr. var. *erigerontis* Arth. (O,I), rust. Eastern and Central States (2,3); Pacific Coast States (4,5,6).
P. stipae Arth. (O,I)—Colo., Wyo. (6). II and III on *Stipa* and other grasses.
P. grindeliae Pk. (O,III)—Utah (4,6); Colo., Nev., Wyo. (6). Correlated with the preceding.
Sclerotium rolfsii Sacc., stem rot. Ill. (1).
Septoria erigerontis Pk., leaf spot. Ind., Iowa, Kans. (2); N.Y. (2,3); Ohio (3); Maine to Md., Nebr., and Mich. (6).
Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Ind., N.Y., Alaska (6).
Synchytrium erigeronii M.T.Cook, leaf gall. La. (2).
Verticillium albo-atrum Reinke & Berth., wilt. Mass. (6).

MOSAIC—unidentified virus. Ind. (6).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Occasional (1,5,6) reported in Md., Miss., N.J., N.Y., Kans., Okla. Also var. *californicus* Holmes—Calif. (6).

Eriophyllum

Eriophyllum spp.

Subshrubs of the Western Plains, sometimes planted for ornament.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematode. Calif.
Puccinia eriophylli Jacks. (II,III), rust. Calif., Oreg., Wyo. O and I unknown.
Uromyces junci (Desm.) Tul. (O,I), rust. Calif. II and III on *Juncus* spp.

Eupatorium, boneset, thoroughwort

(1) *E. coelestinum* L., mistflower.
(2) *E. perfoliatum* L., boneset.
(3) *E. purpureum* L., joe-pye-weed.
(4) *E. rugosum* Houtt. (*E. urticaefolium* Reich.), white snakeroot.

Mostly perennial herbs, numerous in tropical America; some are grown under glass for cut flowers, and some of the United States species are grown in wild gardens; also minor honey plants and useful to wildlife; (2) and (4) are reputedly poisonous to livestock.

Ascochyta compositarum J.J.Davis, leaf spot. W. Va. (3), Wis. (3,4).
Botrytis cinerea Pers. ex Fr., gray-mold blight. N.J. (1,5).
Cercospora ageratoides Ell. & Ev., leaf spot. N.J., W. Va., Wis. (4); Ala., Miss., N.J., Tex. (5).
C. eupatorii Pk.—Ind. (2,3); N.J. (4); Ala., N.Y. (5).
C. perfoliata Ell. & Ev.—Ill. (4,5); Mich. (2); Wis. (2,3,4,5).
Cionothrix praelonga (Wint.) Arth. (O,III), rust. C.Z. (5).
Coleosporium eupatorii Arth. (II,III), rust. P.R. (5). O and I unknown.
Diaporthe arctii (Lasch) Nits., on stems. Ga. (3,4,5).
Discohainesia oenotherae (Cke. & Ell.) Nannf., on stems. Md. (5).
Entyloma compositarum Farl., white smut. Ill., Iowa, Miss., Wis., W. Va. (4).
Erysiphe cichoracearum DC., powdery mildew. General in the Eastern and Central States to Tex. and Minn. (2,3,4,5); P.R. (5). *E. galeopsidis* DC is reported on (4) in Ill. and Wis., but is doubtfully distinct from *E. cichoracearum*.
Fusarium sp., wilt. N.J. (5).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meliola compositarum Earle, and *M. sororcula* Speg., black mildew. P.R. (5).
Meloidogyne sp., root knot nematodes. Ala. (5).
Mycosphaerella sp., on stems. Ga. (3).
Phaeodothiopsis eupatoriae F. L. Stevens, black spot. P.R. (5).
Phyllosticta decidua Ell. & Kell., leaf spot. Wis. (2).
P. eupatoriicola Kab. & Bub.—P.R. (5).
P. eupatorina Thuem., Ill.—N.J. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,4,5).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. N.Y. to Md., Mo., and Wis. (3): Kans, Tex., Wis., W. Va. (4).
Puccinia conoclinii Seym. (II,III), rust. Md. to Ala., Tex., and Ill. (1); Ariz., Fla., Ill., Ind., La., P.R. (5). O and I unknown.
P. eleocharidis Arth. (O,I)—Eastern and Central States to Ala., Tex., and Wyo. (2,3); Va., W. Va. (4); also other species in this range. II and III on *Eleocharis* spp.

P. tenuis (Schw.) Burr. (O,I,III). Mass. to N.C., Nebr., and Minn. (4).
P. tolimensis Mayor (III)—N.Y. (4).
Ramularia dispar J. J. Davis, on old leaves. Tex. (4); Wis. (3,4); Ill., Va. (5).
Rhizoctonia solani Kuehn, root and stem rot. N.J. (5).
Robledia tetraspora Chardon, black spot. P.R. (5).
Sclerotium rolfsii Sacc., stem rot. Conn., N.J. (1); Ill., Tex. (4); Ill., Md., N.J. (5).
Septoria eupatorii Rob. ex Desm., leaf spot. Ill. (1); Miss. (2); Iowa, Tex. (4); La., Miss., Tex., Wis. (5). (? Conidial stage of *Mycosphaerella eupatoriicola* Petr.).
S. eupatoriicola Tehon, Ill. (2).

YELLOWS—? virus (distinct from aster yellows virus). Central States (2). The susceptibility of (2) and (4) to aster yellows virus, *Chlorogenus callistephi* Holmes, has been experimentally demonstrated.

Franseria, bur-sage

Franseria spp.

Shrubs of arid plains in the Southwest, of minor forage value.

Albugo tragopogonis Pers. ex S. F. Gray, white-rust. Tex.
Cercospora racemosa Ell. & Martin, leaf spot. Tex.
Erysiphe cichoracearum DC., powdery mildew. Ariz.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia splendens Vize (O,I,II,III), rust. Ariz., Calif.

Gaillardia

(1) *G. aristata* Pursh, gaillardia.
(2) *G. pulchella* Foug., firewheel.

Perennial (1) or annual (2) herbs of the Far West and Southwest; selected forms, especially of (1) are cultivated for ornament; useful to wildlife.

Coleosporium solidaginis (Schw.) Thuem. (II,III), rust. Calif. (1). O and I on *Pinus* spp.
Entyloma polysporum (Pk.) Farl., white smut. Minn. (1); Kans., Nebr. (2).
Erysiphe cichoracearum DC., powdery mildew. Mont., Okla., Tex. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Puccinia gaillardiae (Diet. & Holw.) Barth. (O,I), rust. Calif. (1). II and III unknown.
Pythium ultimum Trow, root rot. Calif. (1).
Septoria gaillardiae Ell. & Ev., leaf spot. Iowa, Okla., Tex. (1,2); Kans., Mo. (2).
Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Mont., Wash., Wyo. (1).

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (1).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.J., N.Y., Pa. (1). Also var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.—Calif. (2).

Galinsoga

G. parviflora Cav., quickweed.

Annual herb of tropical America, widely distributed in waste ground throughout the United States, a weed in cultivated ground.

Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). T.H.
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.Y. Also var. *californicus* Holmes—Calif.

Gazania

G. rigens R.Br.

Perennial herb of South Africa, grown for ornament and ground cover in warm regions.

Rhizoctonia solani Kuehn, crown rot. Calif.

Gerbera

G. jamesonii Bolus, Transvaal daisy.

Perennial herb of South Africa, grown under glass as a cut flower in the North, and in gardens in the South and California.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Fla., N.Y.
Erysiphe cichoracearum DC., powdery mildew. Calif., Okla.
Gloeosporium sp. (*?Glomerella cingulata* (Ston.) Spauld. & Schrenk), leaf spot, stem rot. N.Y.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif., Fla., Md., N.C., N.Y., T.H.
Phytophthora sp., root and stem rot. Calif., N.J., N.Y. *P. cryptogea* Pethyb. & Laff. and *P. drechsleri* Tucker identified in this association in Calif.
Sclerotinia sclerotiorum (Lib.) d By., crown rot. Md., N.Y.

Gnaphalium, cudweed

(1) *G. decurrens* Ives
(2) *G. purpureum* L.
(3) Other species.

Low annual or biennial herbs, widely distributed in waste ground; occasionally grown as everlasting flowers; useful to wildlife.

Cercospora gnaphaliacea Cke., leaf spot. Miss. (2,3); Kans., Tex., Wis. (3).
C. gnaphalii Harkn.—Calif. (1); Tex. (3).
Cylindrosporium gnaphalicola Atk., leaf spot. Ala., Tex. (3).
Entyloma compositarum Farl., white smut. Ala., ?Md. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H. (3).
Mycosphaerella bakeri Rehm, on stems. Calif. (3).
Phoma erysiphoides Ell. & Ev., stem canker. Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Ala. (2); Miss. (2,3).
Puccinia gnaphalii (Speg.) P.Henn. (II,III), rust. Ala., La., S.C. (2); Ala., N.C. (3). O and I unknown.
P. investita Schw. (O,I,III), rust. Ariz., N.Y., Vt., Wis. (1); Calif., Conn., Mass., N.Y., Pa., Tenn., W. Va. (3).
Septoria cercosperma Rostr., leaf spot. Tex. (3).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (3).
YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (1,3).

Grindelia

(1) *G. squarrosa* (Pursh) Dunal, gumweed.
(2) Other species.

Coarse perennials of the Western States: (1) is widely distributed in waste ground; others are grown for ornament; some are useful to wildlife.

Cercospora grindeliae Ell. & Ev., leaf spot. Tex. (1); Calif., Wis. (2).
Coleosporium solidaginis (Schw.) Thuem. (II,III), rust. Colo., Wis. (1); Calif., Wash. (2). O and I on *Pinus* spp.
Erysiphe cichoracearum DC., powdery mildew. Iowa to N. Mex., Calif., and Mont. (1,2).
Phoma leptospora Sacc., on stems. Tex. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Puccinia extensicola Plowr. var. *solidaginis* (Schw.) Arth. (O,I), rust. Kans., Nebr., Tex. (1). II and III on *Carex* spp.
P. stipae Arth. (O,I)—Colo., Kans., N. Dak., Nebr., S. Dak. (1). II and III on *Stipa* spp. and other grasses.
P. grindeliae Pk. (III)—Nebr. to Tex., Calif., and Mont. (1,2). Correlated with *P. stipae.*
Ramularia grindeliae Ell. & Kell., on old leaves. Kans. (1,2), Tex. (1), N. Mex. (2).
Septoria grindeliae Ell. & Barth., leaf spot. Colo., Kans., Tex. (1); Oreg. (2).
S. grindeliicola Greene—Wis. (1).
Thecaphora californica (Harkn.) Clint., inflorescence smut. Utah (1), Calif. (2).
T. cuneata (Schofield) Clint.—Colo., Kans., Nebr., N. Mex. (1); Nebr. (2).
Uromyces junci (Desm.) L.Tul. (O,I), rust. Calif. II and III on *Juncus* spp.

Gutierrezia

(1) *G. sarothrae* (Pursh) Britton & Rusby; matchweed.
(2) Other species.

Shrubby herbs of the Western Plains; useful to wildlife.

Coleosporium solidaginis (Schw.) Thuem. (II,III), rust. Tex. (2).
Diplodina coloradensis Ell. & Ev., on stems. Colo. (1); Tex. (2).
Erysiphe cichoracearum DC., powdery mildew. Colo., Mont., Tex. (1,2).
E. polygoni DC.—Mont. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Puccinia grindeliae Pk. (III), rust. N.Dak. to Tex., Calif., and Utah (1,2). Correlated with the following.
P. stipae Arth. (O,I)—Mont., Nebr., N. Mex. (1); Tex. (1,2).
Rhabdospora guttierreziae Earle, on stems. Colo. (2).

Helenium, sneezeweed

(1) *H. autumnale* L.
(2) *H. tenuifolium* Nutt.
(3) Other species.

Coarse perennial (1), or annual (2), herbs of plains and prairies, mostly in the Southern and Western States; the perennial types sometimes grown in gardens and useful to wildlife; (1) an occasional weed.

Cercospora helenii Tharp, leaf spot. Ala. (2), Tex. (3).
Entyloma compositarum Farl. (*E. helenii* Cif.), leaf smut. Tex., Wis. (1).
E. polysporum (Pk.) Farl.—Mont. (1).
Erysiphe cichoracearum DC., powdery mildew. Colo., Mont., Oreg., Utah, Wash., Wis., Wyo. (1,3); Tex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Puccinia conspicua (Arth.) Mains (O,I), rust. Ariz., Colo., N. Mex. (3). II and III on *Koeleria cristata.*
P. extensicola Plowr. var. *solidaginis* (Schw.) Arth. (O,I)—Nebr., Tex. (1); Colo., Nebr. (3). II and III on *Carex* spp.
Septoria helenii Ell. & Ev., leaf spot. Tex. (1,2); Wis. (1); Iowa, Pa. (3).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.Y. (1,3). Also var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.—Calif. (2).

Helianthus

I. Cultivated Perennial, Jerusalem-Artichoke

Helianthus tuberosus L., Jerusalem-artichoke.

Coarse perennial of eastern United States to Georgia and Kansas, cultivated for edible tubers.

Cercospora helianthi Ell. & Ev., leaf spot. Kans.
Coleosporium helianthi (Schw.) Arth. (II,III), rust. Ala., Ill., ?Minn., N.C., N.Y., S.C., Okla., Pa., Tenn., Va.
Erysiphe cichoracearum DC., powdery mildew. General.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif., Fla., Md.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Plasmopara halstedii (Farl.) Berl. & De T., downy mildew. Vt. and N.J. to Kans. and S. Dak.
?Pseudomonas helianthi (Kawamura) Burkh., bacterial spot. Ill.
Puccinia helianthi Schw. (O,I,II,III), rust. General.
Rhizopus stolonifer (Ehr. ex Fr.) Lind, soft rot of tubers. Minn.
Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. Mass., Minn., Wash.
Sclerotium rolfsii Sacc., southern blight. Fla., La., Miss., S.C., Tex.
Septoria helianthi Ell. & Kell., leaf spot. Ill., Iowa, Wis.
Sphaerophoma brencklei Petr. (=*Gibberidea heliopsidis* (Schw.) Shear?), on stems. N. Dak.
Uromyces junci (Desm.) L. Tul. (O,I), rust. N. Dak., Nebr.

II. Other Perennials, Sunflowers

(1) *Helianthus atrorubens* L., darkeye sunflower.
(2) *H. decapetalus* L., thinleaf sunflower.
(3) *H. giganteus* L., giant sunflower.
(4) *H. maximilianii* Schrad.
(5) *H. mollis* Lam., ashy sunflower.
(6) *H. rigidus* (Cass.) Desf., stiff sunflower.
(7) Other species.

Coarse herbs of plains, meadows, and open woodlands: (1), (2), (3), and (5) mostly in the Eastern and Southern States; (4) and (6) in the Central States southward and west.

Those listed are sometimes grown for ornament, several are useful to wildlife.

Albugo tragopogonis Pers. ex S.F.Gray, white-rust. Ill., Mo. (7).
Ascochyta compositarum J.J.Davis, leaf spot. Wis. (7).
Cercospora helianthi Ell. & Ev., leaf spot. Tex. (4); Ill., Kans. (6); Kans., Mo., Ohio, Wis. (7).
Coleosporium helianthi (Schw.) Arth. (II,III), rust. N.Y. to Fla., La., and Ind. (2,3); Okla. (6); also various other species in this range and west to Minn. O and I on *Pinus echinata* Mill. and *P. virginiana* Mill.
Colletotrichum helianthi J.J.Davis, leaf spot. Wis. (7).
Cuscuta sp., dodder. Okla., Tex. (7).
Diaporthe arctii (Lasch) Nits., on stems. Ga. (1,7).
Erysiphe cichoracearum DC., powdery mildew. Conn. to Ga., Tex., and Mont. (*).
Gibberidea heliopsidis (Schw.) Shear, black patch on leaves and stems. Wis. (6,7); Ga., Ill., Miss., Mo., ?Mont., N.C., Va. (7).
Mycosphaerella sp., on stems. Ga. (7).
Phyllachora ambrosiae (Berk. & Curt.) Sacc., black pustule. N. Mex. (4,7); ? Calif., Wyo. (7).
Phyllosticta helianthi Ell. & Ev. (nomen nudum), on leaves. Wis. (7). Perhaps = *Gibberidea heliopsidis*.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4,7).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Chiefly in the Central States from Ill. to Kans. and N. Dak. (3,4,6,7); also N.Y., Tex., Mont., Wyo. (7).
Pseudomonas solanacearum E.F.Sm., bacterial wilt. Fla. (7).
Puccinia helianthi Schw. (O,I,II,III), rust. General (*).
P. massalis Arth. (O,I,II,III) — On *H. ciliaris* DC. in N. Mex. and Tex.
Ramularia helianthi Ell. & Ev., on leaves. Calif., Wash. (7).
Septoria helianthi Ell. & Kell, leaf spot. W. Va. (2,3); Ohio to Okla. and Minn. (6,7).
S. inulae Sacc. & Speg.—Ill. (5).
S. paupera Ell.—N.J. (7).
Uromyces junci (Desm.) L.Tul. (O,I), rust. Nebr. (2,4); N. Dak. (4); Kans., Nebr., S. Dak. (6); Calif., Wyo. (7).
U. silphii (Burr.) Arth. (O,I)—N.Y. (3,7); Ill., Mo., Tenn., Wis. (7).

MOSAIC—unidentified virus. Ind. (7).

III. Annuals, Sunflowers

(1) *Helianthus annuus* L., common sunflower.
(2) *H. argophyllus* Torr. & Gray
(3) *H. debilis* Nutt.
(4) *H. petiolaris* Nutt., prairie sunflower.

Annual herbs of the Western (1,4) or Southern (2,3) States: (1) is widely cultivated in selected forms for ornament, also for silage and oil-bearing seed; (1,4) useful to wildlife.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. As experimental host (1).
Albugo tragopogonis Pers. ex S.F.Gray, white-rust. Wis. (1).
Armillaria mellea Vahl ex Fr., root rot. Oreg. (1).
Botrytis cinerea Pers. ex Fr., gray-mold blight, bud rot. Calif., Oreg. (1).
Cercospora pachypus Ell. & Kell., leaf spot. Ala., Kans., Okla., Tex. (1); Kans. (4).
Cuscuta sp., dodder. Okla., Tex., Wash. (1).
Diaporthe arctii (Lasch) Nits., on stems. Nebr. (1).
Entyloma polysporum (Pk.) Farl., leaf smut. Mont. (1).
Erysiphe cichoracearum DC., powdery mildew. General (1), Iowa (3,4), Mich. (4).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophomina phaseoli (Maubl.) Ashby, charcoal stem rot. Md. (1).
Meloidogyne sp., root knot nematodes. Ala., Tex., W. Va., T.H. (1); ?Fla. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,4).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. N.Y. to Md., Kans., and Mont. (1); Tex. (2).
Pseudomonas solanacearum E.F.Sm., bacterial wilt. P.R. (1).
Puccinia helianthi Schw. (O,I,II,III), rust. General (1,4); Calif., Fla., Iowa, Tex. (3).
Pythium debaryanum Hesse, root rot. N. Dak. (1).
P. irregulare Buis. and *P. splendens* Braun—T.H. (1).
Rhabdospora helianthicola (Cke. & Harkn.) Sacc., on stems. Calif. (1).
Rhizoctonia crocorum (Pers.) DC. ex Fr., violet root rot. Tex. (1).
R. solani Kuehn, root and stem rot. Ill., Md., Nebr. N.Y., Wis. (1).
Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. Widespread, reported in Northeastern, North Central, and Pacific States (1).
Sclerotium rolfsii Sacc., southern blight. La., Tex., P.R. (1).
Septoria helianthi Ell. & Kell., leaf spot. Conn. to Miss., N. Mex., and Mont.; general in the Middle West (1); Tex. (2); Minn., Mont. (4).
Tylenchus balsamophilus Thorne, leaf gall. Wash. (1).
Uromyces junci (Desm.) L. Tul. (O,I), rust. Nebr. (1), Okla. (4). II and III on *Juncus* spp.
YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (1).

Helichrysum

H. bracteatum Ndr., strawflower.

Annual herb of Australia, widely grown as an everlasting flower.

Fusarium sp., stem rot. Wash.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla.
Verticillium albo-atrum Reinke & Berth., wilt. Calif.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif., Oreg., Wash.
YELLOWS (bunchy top)—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Eastern and Central States. Also var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.—Calif.

Heliopsis

(1) *H. helianthoides* (L.) Sweet.
(2) *H. scabra* Dunal, oxeye.

Perennial herbs of the Eastern and Central States and southward, sometimes grown in gardens; useful to wildlife.

Coleosporium helianthi (Schw.) Arth. (II,III), rust. N.C. (2). O and I on *Pinus* spp.
Erysiphe cichoracearum DC., powdery mildew. Iowa, Minn., N. Dak., Nebr., N. Mex., Wis. (2).
Gibberidea heliopsidis (Schw.) Shear, black patch on leaves and stems. Miss.

Leveillula taurica (Lév.) Arn., powdery mildew. Iowa (2).
Phyllosticta pitcheriana Fairm., leaf spot. N.Y. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia batesiana Arth. (O,I,III), rust. Del., Pa. (1); Iowa, Kans., Md., Minn., Nebr., Wis. (2).
P. helianthi Schw. (O,I,II,III)—Ind., Minn., N.C., Pa., Va. (1); Ind., Iowa, Minn. (2).
Septoria helianthi Ell. & Kell., leaf spot. Ind. (1).
S. heliopsidis Ell. & Dearn.—Wis. (2).
MOSAIC—unidentified virus. Iowa.

Hieracium, hawkweed

(1) *H. aurantiacum* L., orange hawkweed.
(2) *H. canadense* Michx.
(3) *H. venosum* L.
(4) Other species.

Numerous perennial herbs native in the United States or naturalized from Europe; some occasionally grown in rock gardens, several are useful to wildlife; (1) is a troublesome weed in meadows in the Northeast.

Aecidium columbiense Ell. & Ev. (O,I), rust. N.Y. (3); Calif., Idaho, Oreg., Wash. (4). II and III unknown.
Bremia lactucae Regel, downy mildew. Wis. (1). See note under *Lactuca*.
Cercospora hieracii Ell. & Ev., leaf spot. Ala., N.C. (3).
Erysiphe cichoracearum DC., powdery mildew. Tex. (1), Ill. (2), Pa., Wash. (4).
Phoma hieracii Rostr., stem blight. Tex. (1).
Phyllosticta decidua Ell. & Kell., leaf spot. Wis. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. (Tex. 1,4).
Puccinia extensicola Plowr. var. *hieraciata* (Schw.) Arth. (O,I), rust. Ill., Wis. (2); Pa. to Ill. and Mont., also Calif. and Oreg. (4). II and III on *Carex* spp.
P. maculosa Schw. (III)—Oreg., Tex., Wash. (4). Correlated with the preceding.
P. fraseri Arth. (III,?II)—Pa., Tenn., Va., W. Va. (3); Mont., Nebr., N.H., N.Y., Pa. (4).
P. hieracii (Schum.) Mart. (O,I,II,III)—Tex. (1); Maine to Va., Ill., and Wash. (2); N.C., N.Y., Pa. (3); also on numerous other species in this range, also Fla., Calif., Colo., and Alaska.
Septoria cercosperma Rostr., leaf spot. Tex. (1,4).
S. hieracicola Dearn. & House—N.Y. (4).
Sphaerotheca humuli (DC.) Burr. var. *fulgiginea* (Schlecht.) Salm., powdery mildew. Ill. (4).

Hymenopappus

H. carolinensis (Lam.) Porter

Biennial herb of the Southeastern and South Central States, sometimes grown in wild gardens, useful to wildlife.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Okla.
Puccinia grindeliae Pk. (O,III), rust. Okla.

Hypochoeris

(1) *H. glabra* L.
(2) *H. radicata* L., cats-ear, false-dandelion.

Annual (1) or perennial (2) herbs of Europe, naturalized in the Pacific States; especially (2) a troublesome weed but useful to wildlife.

Ditylenchus dipsaci (Kuehn) Filip., stem nematode. Calif., Oreg., Wash., T.H. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Puccinia hieracii (Schum.) Mart. (O,I,II,III), rust. Calif. (1,2), Oreg. (2).

Inula

I. helenium L., elecampane.

Coarse perennial of Europe and Asia, naturalized in the Eastern States; sometimes grown for ornament and for roots which furnish inulin; useful to wildlife.

Anthostomella rostrospora (Gerard) Sacc., on stems. N.Y.
Erysiphe cichoracearum DC., powdery mildew. N.Y., Wis.
?Puccinia hieracii (Schum.) Mart. (II,III), rust. Wis.
Ramularia sp., leaf spot. Mich.

Iva, marsh-elder

(1) *I. axillaris* Pursh
(2) *I. frutescens* L.
(3) *I. xanthifolia* Nutt.
(4) Other species.

Perennial (1,2) or annual (3) herbs of marshy, sometimes saline waste ground; useful to wildlife.

Aecidium ivae Jacks. (O,I), rust. Del., Fla., La., Md., Va. (2).
Albugo tragopogonis Pers. ex S.F.Gray, white-rust. Wis. (3); Ariz., Ill., Kans., Mo., N. Mex. (4).
Basidiophora kellermanii (Swing. ex Sacc.) G.W.Wils., downy mildew. Wis. to Tex., Colo., and Mont. (3).
Erysiphe cichoracearum DC., powdery mildew. N.J. (2); Colo., N. Dak. (3).
Heterosporium tuberculans Ell. & Ev., leaf spot. N. Dak., Tex. (3).
Phyllachora ambrosiae (Berk. & Curt.) Sacc., leaf spot. Ga. (2,4); S.C. (2); Colo., Iowa, Kans., Mont., Tex. (3).
Phyllosticta ivicola Ell. & Ev., leaf spot. La. (2); N. Dak., Tex., Wis. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Physalospora arthuriana Sacc.: SEE *Phyllachora ambrosiae*.
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. S. Dak. (3).
Puccinia intermixta Pk. (O,I,III), rust. S. Dak. to N. Mex., Calif., and Wash. (1).
P. xanthifolia Ell. & Ev. (II,III)—Iowa to Colo. and Idaho (3). O and I unknown.
Pyrenopeziza absinthii (Lasch) Rehm, on stems. N. Dak. (3).
Ramularia ivae Dearn. & Barth., on leaves. Wyo. (1).
Septoria xanthifolia Ell. & Kell., leaf spot. Kans., N. Dak., Wis. (3,4); Ga. (4).
S. ivicola Ell. & Ev.—Tex. (3).

Krigia

(1) *K. biflora* (Walt.) Blake, dwarf-dandelion.
(2) Other species.

Annual or perennial herbs of the Eastern and

Central States, sometimes grown for ornament; useful to wildlife.

Bremia lactucae Regel, downy mildew. Wis. (1,2). Miss., Mo., Okla. (2). See note under *Lactuca*.
Mycosphaerella krigiae (Ell. & Ev.) Greene, leaf spot. Ill., Wis. (1).
Phoma krigiae Tassi, on stems and bracts. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Puccinia extensicola Plowr. var. *hieraciata* (Schw.) Arth. (O,I), rust. Ill., Iowa, Wis. (1). II and III on *Carex* spp.
P. maculosa Schw. (III)—Ill., Mich., Mo., Pa., Tenn. (1); Miss., Mo., Pa. (2). Correlated with preceding.
P. hieracii (Schum.) Mart. (O,I,II,III)—N.C. (1).
Septoria krigiae Dearn. & House, leaf spot. Ky., N.Y., Wis. (1,2).

Kuhnia

(1) *K. eupatorioides* L., false-boneset.
(2) Other species.

Perennial herb of the Eastern and Central States and southward; sometimes grown in wild gardens.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Pleospora compositarum Earle, leaf spot. N. Mex., Tex. (2).
Puccinia kuhniae Schw. (O,I,II,III), rust. Ind. to Ala., Nebr., and N. Dak. (1); Fla., Tex., and Mont. (2).

Lactuca, lettuce

I. Cultivated Species

Lactuca sativa L.

Cultivated annual, perhaps derived originally from *L. serriola* L., commonly grown in gardens as a salad plant; commercial cultivation predominates in California and Arizona; other leading states: Colorado, Florida, Idaho, New Jersey, New York, Oregon, Washington. In general these records apply alike to all the horticultural types, such as var. *capitata* L., head lettuce, var. *crispa* L., leaf lettuce, and var. *longifolia* Lam., cos, or romaine, lettuce.

Albugo sp., white-rust. Tex.
Alternaria sp., secondary leaf spot. Fla., La., Ohio, Okla., Tex., Wash.; occasional in Northeastern States.
Botrytis cinerea Pers. ex Fr., gray mold rot (chiefly in greenhouses and in markets, sometimes in fields, especially on seed plants). Cosmopolitan. A stem girdle of growing plants is also reported in N.Y.
Bremia lactucae Regel, downy mildew. General. This name is based on the imperfect stage. If the present Rules of Nomenclature are literally applied, the name should be *B. ganglioniformis* (Casp.) C.G.Shaw.
Cercospora longissima Sacc., leaf spot. Fla., Ill., Ind., Tex., Va., Wis., P.R.
Erwinia carotovora (L.R.Jones) Holland, bacterial or slimy soft rot. Cosmopolitan in transit and markets.
Erysiphe cichoracearum DC., powdery mildew. Calif., Mich.
Fusarium sp., root rot, wilt. Ky., Ohio.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Marssonina panattoniana (Berl.) Magn., anthracnose. N.Y. to Fla., Tex., and Mich.; also Calif., Oreg., Wash.
Meloidogyne sp., root knot nematodes. General from Va. to Fla. and Ariz.; T.H.; occasional in greenhouses in the North.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Physarum cinereum Batsch ex Fr., slime mold. Occasional in hotbeds and greenhouses.
Pleospora herbarum (Pers. ex Fr.) Rabh., seed mold, secondary leaf spot. Fla., Ky., N.Y.
Pseudomonas marginalis (N.A.Brown) F.L.Stevens, marginal leaf blight. Kans., Mo., N.J., N.Y.
P. rhizoctonia (R.C.Thomas) Burkh., bacterial rosette. N.Y., Ohio, Pa.
P. viridilivida (N.A.Brown) Holland, bacterial rot. La., Va., Wash.; ?Del., N.H.
Puccinia extensicola Plowr. var. *hieraciata* (Schw.) Arth. (O,I), rust. Ind., Mass., Minn., N. Dak., Wis. II and III on *Carex* spp.
P. hieracii (Schum.) Mart. (II), rust. Calif. Other stages not observed on lettuce.
Pythium spp., damping-off, root rot, stunt, wilt. Cosmopolitan. Commonly identified as *P. debaryanum* Hesse but frequently is caused by *P. ultimum* Trow. *P. polymastum* Drechs. is reported in Conn. The specific cause of a form of root rot termed stunt, as reported in Mich., Mo., and N.Y., has not been identified.
Rhizoctonia solani Kuehn (=*Pellicularia filamentosa* (Pat.) Rogers), bottom rot, rosette, damping-off. General. The basidial stage occasionally develops on this host.
Sclerotinia sclerotiorum (Lib.) d By., drop, watery soft rot. Widespread in greenhouse and field culture, also in transit and markets. *S. minor* Jagger, causing a similar disease, is reported in Fla., La., Mass., N.J., N.Y., Oreg., Pa.
Sclerotium rolfsii Sacc., southern blight. Calif., Fla., N.C., S.C., Tex., Va.
Septoria lactucae Pass., leaf spot. Occasional in the Eastern and Central States to Fla., Colo., and S. Dak.; also T.H.
Stempyhlium botryosum Wallr.: See *Pleospora herbarum*.
Xanthomonas vitians (N.A.Brown) Starr & Weiss, bacterial wilt. N.J., N. Mex., N.Y., Pa., S.C., Va., ? T.H.
Big vein—unidentified virus. Ariz., Calif., Colo., Conn., Ill., Md., N.J., N.Y.
Mosaic — virus (*Marmor lactucae* Holmes, Lactuca virus 1 K.M.Sm.). Widespread, probably general.
Spotted wilt — virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Tex.
Yellows, white heart, Rio Grande disease—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.) Northeastern and Central States to Miss. and Tex.; Colo., Idaho, Oreg., Wyo. Also var. *californicus* Holmes, Callistephus virus 1A K.M.Sm. in Calif.

Brown blight—cause unknown. Ariz., Calif., sometimes reported in markets on produce from these areas. A disease ascribed to an unidentified virus is reported under this name in Ill. and Ind.
Tipburn—physiological, attributed to excessive transpiration and insolation or to high temperature. General.

II. Native and Naturalized Species

(1) *Lactuca canadensis* L., Canada wild lettuce.
(2) *L. graminifolia* Michx., grassleaf lettuce.

(3) *Lactuca pulchella* Pursh, chicory lettuce.
(4) *L. serriola* L., including f. *intergrifolia* Bogenh., prickly lettuce.
(5) *L. spicata* (Lam.) Hitchc., blue lettuce.
(6) Other species.

Biennial or perennial herbs of plains, woodlands, and waste ground: (1,2,3,5) native in the Eastern and Central States; (4) European but widely naturalized in the United States. Several are useful to wildlife; (4) is a troublesome weed; its var. *sativa,* celtuce, is grown for edible stems.

Alternaria sonchi J.J.Davis, leaf spot. Ill. (1); Tex. (1,4,6).
Asteroma lactucae J.J.Davis, on leaves. Tex., Wis. (1,6).
Bremia lactucae Regel, downy mildew. Reported on all species listed except (2), also others, throughout their respective ranges from Mass. to Miss., Tex., Calif., and Wash.
Calosphaeria herbicola Ell. & Ev., leaf spot. Tex. (1,4,6).
Cercospora longissima Sacc., leaf spot. La. (6).
Cuscuta gronovii Willd., dodder. N.Y. (4).
Cylindrosporium lactucicola Ell. & Ev. N.C. (4); Colo. (6).
Diaporthe arctii (Lasch) Nits., on stems. Ga. (1); La. (6).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (1).
Entyloma compositarum Farl., leaf smut. Minn. (1); Tex. (1,4,6).
Erysiphe cichoracearum DC., powdery mildew. Reported on all species named except (2), and on others, within their ranges from Mass. to N.C., N. Mex., Calif., and Mont.
Gibberidea heliopsidis (Schw.) Shear, black knot on stems. Conn. (6).
Guignardia depressa (Pk.) Dearn. & House, on stems. Kans., N.Y. (1); Mich. (6).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Leptothyrium lactucae Dearn. & Barth., on leaves. Kans. (4).
Macrophomina phaseoli (Maub.) Ashby, charcoal stem rot. Ill. (4).
Marssonina panattoniana (Berl.) Magn., anthracnose. Idaho, Wash. (4).
Meloidogyne sp., root knot nematodes.—(4,6).
Ovularia carletonii Ell. & Kell., leaf spot. Colo., Kans., Nebr., S. Dak. (3); Kans. (6).
Phyllosticta spp., leaf spot: *P. decidua* Ell. & Kell.—Wis. (1); *P. lactucae* Atk.—Ala. (1); Tex. (1,4); *P. mulgedii* J.J.Davis—Wis. (5); *P. scariolicola* Tehon—Ill. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Md. (1).
Puccinia extensicola Plowr. var. *hieraciata* (Schw.) Arth. (O,I), rust. Widespread on all species named, and others, in their respective ranges from Mass. to Ill., Colo., and Idaho. II and III on *Carex* spp.
P. minussensis Thuem. (O,I,II,III), rust. Mich., N.Y. (1); Wis. to N. Mex., Utah, and Wash. (3).
Rhabdospora solidaginis Cke. & Ell., on stems. Colo. (6).
Rhizoctonia solani Kuehn, root and stem rot. N.Y. (4).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Calif., ?Mass. (4); Md., Miss. (6).
Sclerotium rolfsii Sacc., southern blight. Tex. (1,4,6).
Septoria lactucae Pass., leaf spot. Central and Eastern States (1,4,6), also Calif., Ga., La. (4); Fla. (2); Wis. (3); Ala. (5).
S. lactucicola Ell. & Martin, leaf spot. N.Y. to Miss., Okla., and Wis. (1); Mich., Ohio, Wis. (4); Maine to Fla., Colo., and S. Dak. (6).
S. unicolor Wint., leaf spot. Kans. (1); Tex. (1,4); Colo., Ill., Mo., Tex. (6).
Sphaerotheca humuli (DC.) Burr., var. *fuliginea* (Schlecht.) Salm., powdery mildew. Md., Wis. (1); Mich. (5,6); Ala., Ind., Md., N.J., Wis. (6).
Synchytrium aureum Schroet., leaf gall. La. (6).
Xanthomonas lactucae-scariolae (Thornberry & H.W. Anderson) Burkh., bacterial leaf spot. Ill. (4).
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Tex. (1,2).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Tex. (1,4), Kans. (4,6). Also var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.—Calif. (4).

Layia

Layia spp., tidy-tips.

Annual herbs of the Pacific Coast States, grown for ornament.

Erysiphe cichoracearum DC., powdery mildew. Calif.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif.

Leontodon

L. autumnalis L., fall-dandelion, hawkbit.

Perennial herb of Europe, sometimes grown in gardens and naturalized in the Northeast; useful to wildlife.

Puccinia hieracii (Schum.) Mart. (O,I,II,III), rust. Maine, N.H.
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Maine, N.Y.

Liatris, gayfeather

(1) *L. pycnostachya* Michx.
(2) *L. scariosa* (L.) Willd.
(3) *L. spicata* (L.) Willd.
(4) Other species.

Erect perennial herbs of prairies and open ground in the Eastern and Central States, also west and south; often grown for ornament.

Coleosporium laciniariae Arth. (II,III), rust. Tex. (1); Ark., Fla., Ga., Tenn. (2); N.J. to Fla. and Ark. (4). O and I on 2- and 3-needle *Pinus* spp.
Cuscuta glomerata Choisy, dodder. Okla. (4).
Erysiphe cichoracearum DC., powdery mildew. Okla. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Leptosphaeria trimeroides Rehm, on stems. N. Dak., Okla. (3).
Meloidogyne sp., root knot nematodes. (3,4).
Phyllosticta liatridis J.J.Davis, leaf spot. Okla., Wis. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Puccinia liatridis (Webber) Bethel (O,I), rust. Ind. (1); Wis. (1,3); Kans., N. Dak. (2); Nebr. (3); Wis. to Colo. and Mont. (4). II and III on *Koeleria cristata* and *Agrostis* spp.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. N.Y. (4).

Septoria liatridis Ell. & J.J.Davis, leaf spot. Tex. (1); Wis. (1,2,3,4); N. Dak. (2); Iowa, Minn. (4).
Verticillium albo-atrum Reinke & Berth., wilt. N.J. (1,2,4).

Madia

(1) *M. elegans* D. Don, common tarweed.
(2) *M. sativa* Mol., Chile tarweed.
(3) Other species.

Annual (1,2) and several perennial herbs, mostly in the Pacific Coast States; useful to wildlife.

Coleosporium madiae Cke. (II,III), rust. Calif., Oreg., Wash. (*). O and I on *Pinus radiata*.
Entyloma madiae Cif., white smut. N. Dak. (3).
Erysiphe cichoracearum DC., powdery mildew. Calif. (1,3); Mont., N. Mex. (3).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Calif. (2).
Puccinia nuda Ell. & Ev. (II,III), rust. Oreg. (1,3); Wash. (2).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Calif. (2).
YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (1).

Malacothrix

(1) *M. arachnoidea* McGregor
(2) Other species.

Mostly annual herbs of plains and deserts in the Far West; sometimes grown for ornament.

Puccinia hieracii (Schum.) Mart. (O,I,II,III), rust. Calif. (2).
P. harknessii Vize (III), rust. Calif. (1,2). Correlated with the preceding.
Synchytrium innominatum Farl., leaf gall. Calif. (2).

Matricaria

(1) *M. chamomilla* L., false-camomile.
(2) *M. matricarioides* (Less.) Porter, pineappleweed.

Annual herbs: (1) native of Europe, sometimes grown in herb gardens and escaped in the Eastern States; (2) native of the Far West, an occasional weed.

Albugo tragopogonis Pers. ex S.F.Gray, white-rust. Calif., N. Dak., Oreg., Wash. (2).
Erysiphe cichoracearum DC., powdery mildew. Wash. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. (1).
Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Wash. (2).
YELLOWS — virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.) Calif. (2).

Mikania

(1) *M. scandens* (L.) Willd., climbing hempweed.
(2) Other species.

Twining herbs of the Eastern and Southern States and southward, sometimes grown in wild gardens and for plant cover.

Cercospora mikaniae Ell. & Ev., leaf spot. Miss. (1).
C. mikanicola F.L.Stevens—P.R. (2).
Endophylloides portoricensis Whet. & Olive (III), rust. C.Z., P.R. (2).
Meliola compositarum Earle, black mildew. P.R. (2).
M. sororcula (Speg.) F.L.Stevens—P.R. (2).
Puccinia spegazzinii DeT. (III), rust. Ala., Fla., Miss., N.C., C.Z., P.R. (1); Fla., P.R. (2).
Septoria mikanii Wint., leaf spot. Conn., Tex. (1); P.R. (2).

Parthenium

(1) *P. argentatum* A.Gray, guayule.
(2) *P. integrifolium* L., American feverfew.
(3) Other species.

Shrub of arid plains in Mexico and southwestern United States, cultivated commercially for rubber in California (1); perennial herbs (2,3); (2) endemic in the Eastern and Central States.

Albugo tragopogonis Pers. ex S.F.Gray, white-rust. Iowa (2), Kans. (3).
Alternaria sp., secondary leaf spot. Calif. (1).
Botrytis cinerea Pers. ex Fr., seedling blight, gray-mold rot. Calif. (1).
Cercospora partheniphila Chupp & Greene, leaf spot. Wis. (2,3).
Coleosporium terebinthinaceae (Schw.) Arth. (II,III), rust. Ala., Ga., La., N.C., Tenn., Va. (2); Ga. N.C., Tenn., Va. (3). O and I on 2- and 3-needle *Pinus* spp.
Diplodia theobromae (Pat.) Nowell, dieback. Calif., Tex. (1).
Erwinia carotovora (L.R.Jones) Holland f. *parthenii* Starr, bacterial stem rot. Calif. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophomina phaseoli (Maubl.) Ashby, charcoal stem rot. Calif., Tex. (1).
Meloidogyne sp., root knot nematodes (resistant). Ariz. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz. (1); Tex. (1,3).
Phytophthora drechsleri Tucker, root rot. Ariz., Calif., N. Mex., Tex. (1).
Puccinia parthenii (Speg.) Arth. (II,III), rust. Tex. (3). O and I unknown.
P. melampodii Diet. & Holw. (III)—Tex. (3).
Pythium ultimum Trow, damping-off, pink root rot. Calif. (1).
Rhizoctonia solani Kuehn, damping-off. Calif. (1).
Sclerotinia minor Jagger, and *S. sclerotiorum* (Lib.) d By., stem rot. Calif. (1).
Sclerotium rolfsii Sacc., southern blight. Ariz. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Ariz., Calif., N. Mex., Tex. (1).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Tex. (3).

Petasites

(1) *P. frigidus* (L.) Fr.
(2) *P. palmatus* (Ait.) A.Gray, butterbur.

Perennial herbs of northern latitudes, sometimes grown in wild gardens (European species more commonly than these).

Puccinia poarum Niels. (O,I), rust. Alaska (1). II and III on *Poa* and *Festuca* spp. in Europe.
P. conglomerata (Strauss) Schmidt & Kunze (III)—Alaska (1); Mich., Minn., N.Y., Wis. (2).
Ramularia variegata Ell. & Holw., leaf spot. Wis. (2).

Stagonospora petasitidis Ell. & Ev., leaf spot. Wis. (2).
Synchytrium aureum Schroet., leaf gall. Wis. (2).

Piqueria

P. trinervia Cav. (*Stevia serrata* Hort.), stevia.

Perennial herb of Mexico and Central America, grown under glass and widely used as filling material in floriculture.

Corynebacterium fascians Tilford (Dows.), fasciation. Mich.
Erysiphe cichoracearum DC., powdery mildew. Ill.
Pratylenchus pratensis (De Man) Filip., root nematode. N.J.
Rhizoctonia solani Kuehn, damping-off. Ill.
Sclerotium delphinii Welch, stem rot. N.J.
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Mich., N.J.

Pluchea

(1) *P. camphorata* (L.) DC., marsh-fleabane.
(2) Other species.

Coarse annuals of salt marshes of the Atlantic and gulf coasts, useful to wildlife.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla. (2).
Phleospora plucheae Stevenson, on leaves. Tex. (2).
Puccinia plucheae (Syd.) Arth. (I,II,III), rust. Fla. (1); P.R. (2).
Septoria plucheae Guba, leaf spot. Mass. (1).

Prenanthes, rattlesnake-root

(1) *P. alba* L.
(2) *P. aspera* Michx.
(3) *P. trifoliolata* (Cass) Fern.
(4) Other species.

Perennial herbs of woodlands (1,3) and plains (2), in the Eastern and Central States; sometimes grown in wild gardens.

Bremia lactucae Regel, downy mildew. Iowa, Mass., Minn. (1); Mass. (4).
Cercospora brunnea Pk., leaf spot. Wis. (1); Ark., N.C. (4).
C. prenanthis Ell. & Kell.—Ind. (1), Kans. (2), Ala. (4).
C. tabacina Ell. & Ev.—Wis. (1).
Diplodia natalensis P.Evans, on stems. Ala. (4).
Erysiphe cichoracearum DC., powdery mildew. N.Y. (1); Ill., Md., N.C., Pa. (4).
Laestadia prenanthis Ell. & Ev., leaf spot. Ala. (4).
Phlyctaena simulans (Berk. & Curt.) Sacc., on stems. N.H. (4).
Puccinia atropuncta (O,I), rust. Pa., Va. (3). II and III on *Amianthium muscaetoxicum*.
P. extensicola Plowr. var. *hieraciata* (Schw.) Arth. (O,I)—Ill., Minn., N.Y., Wis. (1,4); Va. (3). II and III on *Carex* spp.
P. insperata Jacks. (I,II,III)—Oreg., Alaska (4).
P. orbicula Pk. & G.W.Clint. (O,I,II,III)—Maine to Tenn. and N. Dak. (1,3,4).
Septoria nabali Berk. & Curt., leaf spot. N.Y. to Iowa and Wis. (1); Va. (3); Maine to Va., Ohio, and Wis. (4).
Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Ohio, Pa., Wis. (1); N.Y. to Ala., Ill., and Minn.; Alaska (4).
Synchytrium aureum Schroet., leaf gall. Wis. (1).

Ratibida (Lepachys), prairie-coneflower

(1) *R. columnaris* (Sims) D. Don
(2) *R. pinnata* (Vent.) Barnhart

Perennial herbs of dry prairies in the Central States and westward (1), or east and south (2); grown in gardens, especially (1).

Cercospora ratibida Ell. & Barth., leaf spot. Kans. (1); Wis. (2).
Entyloma compositarum Farl. (*E. lepachydis* Cif.), white smut. Nebr. (1); Mich. to Ind., Kans., and Minn. (2).
Erysiphe cichoracearum DC., powdery mildew. N. Dak., Tex. (1).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Iowa (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora lepachydis Ell. & Ev., leaf spot. Mont. (1).
Ramularia rudbeckiae Pk., leaf spot. Idaho (1).
Rhizoctonia crocorum (Pers.) DC. ex Fr., violet root rot. Tex. (1).
Septoria infuscata Wint., leaf spot. Mich., Mo., Wis. (2).
S. lepachydis Ell. & Ev.—Kans. (1); Wis. (2).
S. rudbeckiae Ell. & Halst.—N. Mex., N. Dak. (1).
Uromyces perigynius Halst. (O,I), rust. N. Dak., Tex. (1). II and III on *Carex* spp.

Rudbeckia

(1) *R. hirta* L., black-eyed-susan.
(2) *R. laciniata* L., especially the cultivated double form, var. *hortensia* Bailey, golden-glow.
(3) *R. triloba* L., brown-eyed-susan.
(4) Other species.

Biennial, or sometimes annual (1,3) or perennial (2), herbs, widely distributed in nature and cultivated for ornament.

Aecidium batesii Arth. (O,I), rust. Nebr. (1).
Cercospora rudbeckiae Pk., leaf spot. N.Y. (2).
C. tabacina Ell. & Ev.—Wis. (1,2); Ill., N.Y., Tex. (2); Iowa (3).
Colletotrichum rudbeckiae Pk., on stems. N.Y. (2).
Diaporthe arctii (Lasch) Nits., on stems. Ga. (2).
Entyloma compositarum Farl. (*E. anceps* Cif.), white smut. Iowa, Mo., Ohio, Wis. (2); Iowa (4).
E. polysporum (Pk.) Farl. (*E. davisii* Cif.)—Wis. (1).
Erysiphe cichoracearum DC., powdery mildew. Iowa, Mass., S. Dak., Va. (1); general (2); Utah (4).
Mycosphaerella rudbeckiae Clements, on stems. Colo. (1).
Phyllosticta rudbeckiae Ell. & Ev., leaf spot. Iowa, N.Y., Tex., Wis. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3,4).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. N. Dak., N.Y. (1); Iowa, N.C., N. Dak, Nebr., Tex., Wis. (2); Iowa (3).
Puccinia extensicola Plowr. (? var. *rudbeckiae* Arth.) (O,I), rust. Md., S. Dak. (2). Has been so reported but identity with this species having II and III on *Carex* has not been proved by cultures; perhaps *Uromyces perigynius*.
P. rudbeckiae Barth. (III)—Tex. (4).
Ramularia rudbeckiae Pk., leaf spot. Vt. to Miss., Colo., and Idaho (2); Mont., Va., Vt., W. Va. (4).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Conn. (2).

Sclerotium rolfsii Sacc., southern blight. Fla. (2); N.J. (4).
Septoria rudbeckiae Ell. & Halst., leaf spot. Del., Wis. (1); Iowa, Kans., Nebr., Tex., Wis. (2); Iowa (3); Colo., Ill., Mass., Miss., Wash., Wis. (4). Also var. *oaklandica* Sacc.—N.Y. (1).
Synchytrium aureum Schroet., leaf gall. Ill., Wis. (2).
Uromyces perigynius Halst. (O,I), rust. Md. to Mo. and Mont. (2); II and III on *Carex* spp.
U. rudbeckiae Arth. & Holw. (III)—? Mont. (1); Md. to Miss., N. Mex., and Mont. (2); Miss. (3); Tex. (4).
Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (1).
MOSAIC—unidentified virus. Ind. (2); Ill. (4).
YELLOW DWARF—virus (*Aureogenus vastans* (Holmes) Black, Solanum virus 16 K.M.Sm.). N.Y. (1).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.Y. Also var. *californicus* Holmes—Calif.

Scorzonera

S. hispanica L., black-salsify.

Perennial herb of Europe, cultivated as a root vegetable.

Albugo tragopogonis Pers. ex S.F.Gray, white-rust. Calif.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla.
YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif.

Senecio

I. Cultivated Species

(1) *Senecio cineraria* DC., dusty miller.
(2) *S. cruentus* (Mass.) DC. (including hybrids derived mainly from this), florists' cineraria.
(3) *S. petasitis* DC., velvet groundsel.
(4) *S. scandens* Buch.-Ham., climbing groundsel.

Mostly exotic perennial herbs, also shrubs and vines, of warm regions, cultivated for ornament under glass or in the open in warm climates.

Botrytis cinerea Pers. ex Fr., leaf spot, blight. Ind., Mo., N.J., Pa., Alaska.
Erysiphe cichoracearum DC., powdery mildew. Mass. (2).
Fusarium sp., stem rot. Pa. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. (1), Md. (2).
Phytophthora sp., stem rot. N.J. (2).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. N.Y. (2).
Pythium sp., root rot. Md. (2).
P. ultimum Trow—Calif. (2).
Rhizoctonia solani Kuehn, damping-off. Ill., N.J. (2).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Wash. (2).
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Mass. (2).
Verticillium albo-atrum Reinke & Berth., wilt. N.J., N.Y., Wash. (2).
MOSAIC—unidentified virus. Wash. (2).
SPOTTED WILT, STREAK—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Tex., Wash. (2).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.Y. (2).

II. Native and Naturalized Species, Groundsel, Ragwort

(1) *Senecio aureus* L.
(2) *S. integerrimus* Nutt.
(3) *S. triangularis* Hook.
(4) *S. vulgaris* L.
(5) Other species.

Many perennial and some annual herbs widely distributed in the United States; some may be grown in wild gardens, some are useful to wildlife, a few are weeds in cultivated ground.

Albugo tragopogonis Pers. ex S.F.Gray, white-rust. Ind., Wis. (1); Mo., Mont. (1,5); Nev. (2); Calif., Colo., Tex., Utah, Wash. (5).
Aphelenchoides ritzema-bosi (Schwartz) Steiner & Buhrer, leaf nematode. (5).
Baeodromus californicus Arth. (III), rust. Calif. (5).
Cercospora senecionicola J.J.Davis, leaf spot. Wis. (1).
C. senecionis Ell. & Ev.—Tex. (5).
Coleosporium occidentale Arth. (II,III), rust. Idaho, Mont., Oreg., Wash. (3); Calif., Colo., Mont., Utah, Wash., Wyo. (5). O and I unknown.
C. senecionis (Pers.) Fr. (II,III)—Colo., R.I. (4). O and I on *Pinus sylvestris* in Europe.
Entyloma compositarum Farl., white smut. Md., Nebr., Pa. (1); Wis. (as *E. wisconsiniense* Cif.) (1); Kans., Pa., Tex. (5).
Erysiphe cichoracearum DC., powdery mildew. Minn., Va. (1); Idaho, Nebr., Wash. (5).
Fusarium sp., wilt. N.J. (5).
Gloeosporium senecionis Ell. & Ev., leaf spot. Calif. (5).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H. (5).
Phyllosticta garrettii Syd., leaf spot. Oreg., Wyo., Alaska (3); Utah, Wyo. (5). *Phyllosticta* sp.—N.J. (5).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (5).
Phytophthora sp., stem rot. N.J. (5).
Puccinia angustata Pk. var. *eriophori* (Thuem.) Arth. (O,I), rust. Conn. to Iowa and Minn. (1); N.H., Oreg., Utah, Vt. (5). II and III on *Eriophorum* and *Scirpus*.
P. recedens (III)—Conn. to Va., Tenn., Iowa, and Wis. (1); N.C., and N. Dak. to Oreg. and Wash. (5). Correlated with the preceding.
P. extensicola Plowr. var. *hieraciata* (Schw.) Arth. (O,I)—Nebr. (2); N. Mex., ?Tex. (5). II and III on *Carex* spp.
P. stipae Arth. (O,I)—Colo., Wyo. (2,5); Nebr. (5). II and III on *Stipa* and other grasses.
P. subcircinata Ell. & Ev. (O,I,III)—N. Dak., Nebr., Nev. (2); Idaho, Utah, Wash. (3); N. Dak. to N. Mex., Calif., and Wash. (5).
P. expansa Lk. (III)—Calif., Utah, Wash., Wyo. (5). Correlated with the preceding.
Ramularia filaris Fres., leaf spot. Colo., Mont. (5).
R. pruinosa Speg.—Colo. (5); Wyo. (3,5).
R. senecionis (Berk. & Br.) Sacc.—Calif., Colo. (5). Also var. *carniolicola* Jaap—Calif. (5).
Rhizoctonia solani Kuehn, root rot. Ill., N.J. (5).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. La. (5).
Septoria cacaliae Ell. & Kell., leaf spot. Ala., Ind., Tex. (5).
S. senecionis West.—Calif. (5).

Septoria senecionis-aurei J.J.Davis—Wis. (1,5).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Wyo. (3), Calif. (5). Also var. *fuliginea* (Schlecht.) Salm.—Calif., Colo., Mont., Wyo. (3); Utah (5).
Synchytrium aureum Schroet., leaf gall. Wis. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Wash. (5).
YELLOWS — virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (4).

Sericocarpus

(1) *S. asteroides* (L.) B.S.P., whitetopped-aster.
(2) Other species.

Perennial herbs of the Eastern and Southern States, sometimes grown in wild gardens.

Coleosporium solidaginis (Schw.) Thuem. (II,III), rust. Conn. (1). O and I on 2- and 3-needle *Pinus* spp.
Diaporthe linearis (Nees) Nits., on stems. Ga. (1).
Mycosphaerella sp., on stems. Ga. (1).
Puccinia extensicola Plowr. var. *solidaginis* (Schw.) Arth. (O,I), rust. Tenn. (1); Ind., N.C. (2).
Pyrenopeziza sp., on stems. Ga. (1).

Silphium

(1) *S. laciniatum* L., compassplant.
(2) *S. perfoliatum* L., Indian-cup.
(3) *S. terebinthinaceum* Jacq.
(4) Other species.

Tall perennial herbs of prairies and open woodlands in the Central States, east and southward; sometimes grown in wild gardens, especially (1) and (2).

Ascochyta compositarum J.J.Davis, leaf spot. Wis. (2).
A. treleasei Berk. & Vogl.—Wis. (4).
Cercospora silphii Ell. & Ev., leaf spot. Ill. (1,2); Wis. (1,3); Ala., Kans., Tex., W. Va. (4). Also var. *laciniati* Tehon & Daniels. Ill. (1).
Coleosporium terebinthinaceae (Schw.) Arth. (II,III), rust. Common on the species named and others within their range from Pa. to Fla., Tex., and Kans. O and I on 2-needle *Pinus* spp.
Colletotrichum silphii J.J.Davis, leaf spot. Wis. (2,4).
Diaporthe arctii (Lasch) Nits., on stems. Ga. (4).
Ellisiella mutica Wint., on leaves. Mo. (4).
Entyloma compositarum Farl., white smut. Tex., Wis. (4).
Erysiphe cichoracearum DC., powdery mildew. Conn. (3), Md. (4).
Leptosphaeria coniothyrium (Fckl.) Sacc., on stems. Ga. (4).
Mycosphaerella sp., on leaves. Wis. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Ill., Iowa (1); Wis. to Ark., Kans., and Minn. (2); Ill., Wis. (3); Kans., Nebr., Tex., Wis., W. Va. (4).
Puccinia silphii Schw. (III), rust. On the species named and others within their range from N.C. to Ala., Tex., and N. Dak.
Rhizoctonia solani Kuehn, root rot. Maine (4).
Septoria alba Ell. & Barth., leaf spot. Ill., Kans. (4).
S. silphii Ell. & Ev.—Iowa, Wis. (2); Tex., Wis. (4).
Uromyces silphii (Burr.) Arth. (O,I), rust. Ohio to Mo., Kans., and Wis. (*). II and III on *Juncus* spp. The name *U. junci-tenuis* Syd. is preferred by some authors.

Solidago, goldenrod

(1) *S. altissima* L.
(2) *S. bicolor* L.
(3) *S. caesia* L.
(4) *S. canadensis* L.
(5) *S. graminifolia* L.
(6) *S. rugosa* Mill.
(7) Other species.

Numerous perennial herbs, widely distributed throughout the United States; many used in wild gardens, sometimes becoming weeds; some are potential sources of rubber; several are important honey plants.

Ascochyta compositarum J. J. Davis, leaf spot. Wis. (1).
Asteroma solidaginis Cke., black scurf on leaves. Iowa (4).
?Asteromella astericola J. J. Davis, on leaves. Wis. (1,7). SEE *Sclerotium mendax*.
Basidiophora entospora Roze & Cornu, downy mildew. Ill., Wis. (7).
?Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., stem canker. Iowa (7).
Cercospora parvimaculans J. J. Davis, leaf spot. Wis. (7). May be identical with *C. stomatica* Ell. & J. J. Davis reported in Iowa, Tex., and Wis. (7).
C. solidaginis Chupp & Greene—Wis. (7).
C. virgaureae Thuem. (*Cercosporella virgaureae* (Thuem.) Allesch.)—N.J. to Ala., Kans., and Wis. (1,2,4,7); ? Mont. (7). *Cercosporella dearnesii* Bub. & Sacc., reported in Wis., *C. nivea* Ell. & Barth., in Kans., Nebr., and Wis., and *C. reticulata* Pk., in N.Y., are doubtfully distinct and have been treated as synonyms by some authors.
Cladosporium astericola J. J. Davis, leaf mold. Wis. (1,7).
Coleosporium delicatulum (Arth. & Kern) Hedgc. & Long (II,III), rust. Maine to Va. and Kans. (5); on other species, sometimes referred to *Euthamia*, extending to Fla. and Tex. O and I on 2- and 3-needle *Pinus* spp.
C. solidaginis (Schw.) Thuem. (II,III), rust. General on (1,2,3,4,6,7) throughout their range in the U. S. O and I on 2- and 3-needle *Pinus* spp.
Colletotrichum solitarium Ell. & Barth., leaf spot. Nebr., Wis. (1); Kans., and Wis. (7).
Cuscuta spp., dodder. Occasional on many species throughout the Eastern and Central States and southward. *C. gronovii* Willd., *C. indecora* Choisy, and *C. glomerata* Choisy are particularly mentioned on *Solidago* spp.
Diaporthe linearis (Nees) Nits., on old stems. Ga., Mich., N. Dak., N.J. (On various species, probably saprophytic.)
Elsinoë solidaginis Jenkins, spot anthracnose. Fla., Ga. (1,2,3,4,6,7); S.C. (1,7).
Erysiphe cichoracearum DC., powdery mildew. General on the species named, except (5), and on others, throughout their range in the U. S.
Gibberidea heliopsidis (Schw.) Shear, black knot. Conn., Mo., N. Dak., N.Y. (7).
Leptothyrium similisporum Ell. & J. J. Davis (=*L. tumidulum* Sacc.?), on leaves and stems. Ill., N.Y., Wis. (7).
Macrophoma gallicola Sacc., on blister-galls. N. Dak. (7).
M. sphaeropsispora (Ell. & Ev.) Tassi, leaf spot. Calif. (7).
Mycosphaerella sp. (*Sphaerella solidaginea* Ell. & Kell.), on leaves. Kans. (4), ? Ga. (3,7), ? Fla. (7).
Pellicularia koleroga Cke., thread blight. La. (7).

Phoma solidaginis Cke. var. *longispora* Sacc., on stems. N.Y. (7).

Phyllachora solidaginis (Schw.) Sacc. Name erroneously applied to a blister-gall caused by insects (*Asteromyia* spp.); other fungi but not *Phyllachora* may be present but are probably incidental. Commonly on (5), also on (3), (6), and others.

?Phyllactinia corylea Pers. ex Karst., powdery mildew. Wash. (7).

Phyllosticta gallicola Ell. & Ev., on blister-galls. Colo. (7). SEE ALSO *Macrophoma*, *Phyllachora*, and *Rhytisma*.

P. solidaginicola Tehon & Daniels, leaf spot. Ill., Wis. (7).

P. solidaginis Bres.—Wyo. (4), Wis. (7).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,7).

Physalospora obtusa (Schw.) Cke., on stems. Ga. (7).

Placosphaeria haydeni (Berk. & Curt.) Petr. (*Ophiodothis haydeni* Sacc., *Phyllachora haydeni* Dearn.), black spot on stems and leaves. Iowa (4).

Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Ill., Wis. (7).

Pratylenchus pratensis (De Man) Filip., root nematode. Fla. (1,6,7).

Puccinia extensicola Plowr. var. *euthamii* Arth. (O,I), rust. Maine to Va. and Wis. (5); also on related species, sometimes referred to *Euthamia*, in this range and west to Oregon.

P. extensicola var. *solidaginis* (Schw.) Arth. (O,I)—General on 1,2,3,4,6, and many other species throughout their range in the U. S. II and III on *Carex* spp.

P. virgaureae (DC.) Lib. (III)—Ill. (1); N.H. (6); Mass., Mich., N.Y. (7).

P. stipae Arth. (O,I)—Colo., Mont., N. Dak., Nebr., N. Mex., S. Dak. (7). II and III on *Stipa* and other grasses.

P. grindeliae Pk. (III)—Ill. and Wis. to Calif., and Wash. (7). Correlated with the preceding.

Pyrenopeziza artemisiae var. *solidaginis* Rehm, on dead stems. N.Y. (7).

Ramularia minax J. J. Davis, on leaves. Tex., Wis. (7).

R. serotina Ell. & Ev., leaf spot. Colo., Ill., Tex., Wis., Wyo.

R. virgaureae Thuem.: SEE *Cercospora virgaureae*.

Rhabdospora solidaginis (Cke. & Ell.) Sacc., on stems. Colo., Ind. (4); N.J. (7).

R. subgrisea Pk., on stems and galls. Mich., N.Y. (7).

Rhodochytrium spilanthidis Lagh., leaf gall. La. (7).

Rhytisma solidaginis Schw. Name erroneously applied to blister-galls caused by insects (*Asteromyia* spp.), commonly on (5) and other species referred to *Euthamia*.

Sclerotium mendax Sacc., on leaves. N.Y. (1); Wis. (1,4,7). Associated with *Asteromella astericola* but connection not confirmed.

Septoria spp., leaf spot or on necrotic parts of leaves. Numerous questionable species reported, those considered synonyms by some authors are indicated below:

S. atropurpurea Pk.—Ill., Wis. (7).

S. brevis Pk.—N.Y. (7).

S. davisii Sacc.—Tex., Wis. (4,7); Colo., Fla. (7).

S. fumosa Pk. (*S. angularis* Dearn. & Barth., ? *S. davisii*)—Wis. (1,5,7,); N.Y. (4,7); Ill., Iowa, Mo. (7).

S. solidaginicola Pk. (? *S. intermedia* Ell. & Ev.)—Wis. (1,3,4,7); S. Dak. (3); Kans., N.Y. (7).

S. solidaginis Thuem.—Iowa (4), S.C. (7).

S. virgaureae Desm. (? *S. dolichospora* Ell. & Ev.)—Iowa (4,7); Ala., Mich., Mo., S.C. (7).

Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Ind. (7).

Thecaphora cuneata (Schofield) Clint., inflorescence smut. Kans. (7).

?Uncinula sp., powdery mildew. N.Y. (7).

Uromyces perigynius Halst. (O,I). Maine (6). II and III on *Carex* spp.

U. solidaginis (Sommerf.) Niessl (III)—Colo., Idaho, Mont., Oreg., Wash., Wyo. (7).

MOSAIC—unidentified virus. N.Y. (7).

Sonchus, sowthistle

(1) *S. arvensis* L.
(2) *S. asper* (L.) Hill
(3) *S. oleraceus* L.

Coarse perennial (1) or annual (2,3) herbs of Europe, widely naturalized in the United States; important agricultural weeds, especially in the spring-wheat area, but useful to wildlife; (3) is sometimes used for greens.

Alternaria sonchi J. J. Davis, leaf spot. Mass. (1); La., N.Y., Tex., Wis. (2); Fla., Tex. (3).

Bremia lactucae Regel, downy mildew. Md. (1); N.Y., Oreg. (2); Fla., N.Y., S.C., Tex. (3). See note under *Lactuca*.

Coleosporium sonchi-arvensis (Pers.) Lév. (II,III), rust. Wash. (1); Wis. (2). O and I on *Pinus sylvestris*.

Diaporthe arctii (Lasch) Nits., on stems. Ga. (3).

Erysiphe cichoracearum DC., powdery mildew. Fla., Pa. (3).

?Phyllosticta sonchi Sacc., leaf spot. N. Dak. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,3).

Sclerotinia sclerotiorum (Lib.) d By., stem rot. Tex. (*); Fla. (3).

Septoria sonchifolia Cke., leaf spot. Wash. (1); Maine, S.C., Tex., Wis. (2); Ill., ? Ala., Tex. (3).

Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Iowa, Pa. (3).

YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.) N.Y. (1,2), Tex. (2). Also var. *californicus* Holmes—Calif. (2,3).

Stephanomeria

(1) *S. cichoriacea* A.Gray, wirelettuce.
(2) Other species.

Perennial herbs of California, sometimes grown for ornament.

Cercospora clavicarpa Ell. & Ev., leaf spot. Calif. (2).

Puccinia harknessii Vize (O,I,III), rust. Mont. to N. Mex., Calif., and Wash. (2). Also var. *major* Arth. (O,I,III)—Calif. (1,2).

Stevia

Plants of this genus are seldom cultivated; for florists' Stevia see *Piqueria trinervia*.

Stokesia

S. laevis (Hill) Green, stokes-aster.

Perennial herb of the Southeastern and Gulf States, cultivated for ornament.

Ascochyta sp., leaf spot. Iowa, Pa.

Botrytis cinerea Pers. ex Fr., head blight. N.Y.

MOSAIC—unidentified virus. Iowa.

Tagetes

(1) *T. erecta* L., Aztec (African) marigold.
(2) *T. patula* L., French marigold.
(3) Other species and hybrids.

Annual herbs of Mexico, widely cultivated for ornament.

Alternaria sp., leaf spot (? secondary). N.J. (3).
Aphelenchoides tagetae Steiner, root-feeding nematode. Md. (3).
Botrytis cinerea Pers. ex Fr., head blight. Conn., N.J., Pa., Alaska (*).
Cercospora sp., leaf spot. Conn. (3).
C. tageticola Ell. & Ev.—Fla. (2).
Coleosporium madiae Cke. (II,III), rust. Calif. (1). O and I on *Pinus radiata*.
Fusarium sp. (? *F. oxysporum* Schlecht. f. *conglutinans* (Wr.) Snyd. & Hans.), wilt, stem rot. Calif. (1); N.J., N.Y. (1,2).
Helminthosporium sp., flower spot. Tex. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Macrophomina phaseoli (Maubl.) Ashby, charcoal stem rot. Okla. (3).
Meloidogyne sp., root knot nematodes.
Paraphelenchus micoletzkyi Steiner, root-feeding nematode. Md. (3).
Phytophthora cryptogea Pethyb. & Laff., stem rot, wilt. N.Y. (3).
Pseudomonas solanacearum E.F.Sm., bacterial wilt. Fla. (1).
Puccinia tageticola Diet. & Holw. (II,III), rust. P.R. (1,2); Tex. (3).
Pythium ultimum Trow, root rot. Calif. (2).
Rhizoctonia solani Kuehn, root and stem rot. Tex. (1,2).
Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. N.Y. (3).
Sclerotium rolfsii Sacc., southern blight. Fla., N.J., Va. (3).
?Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (3).
Mosaic—virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.). Fla. (1,2).
Yellows—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Conn., N.J., N.Y., Pa., Wis. (1,2). Also var. *californicus* Holmes—Calif. (1,2).

Tanacetum

(1) *T. vulgare* L., tansy.
(2) *T. capitatum* (Nutt.) T. & G.

Perennial herbs: (1), native of Europe, grown in old gardens for ornament and pharmaceutical use, and occasionally escaped; (2) endemic in the northern Rocky Mountains, sometimes cultivated.

Erysiphe cichoracearum DC., powdery mildew. Pa. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ? Fla. (1).
Puccinia absinthii (Hedw. f.) DC. (O,I,II,III), rust. Wyo. (2).
Ramularia tanaceti Lind, leaf spot. Wis. (1).

Taraxacum

(1) *T. officinale* Weber, common dandelion.
(2) *T. kok-saghyz* Rodin, Russian dandelion.

Perennial herbs of Europe: (1) widely naturalized and a common weed in lawns and meadows, also a minor honey plant; selected forms are grown for greens and pharmaceutical use; (2) has been grown as a source of rubber.

Ascochyta taraxaci Grove, leaf spot. Alaska (3).
Botrytis cinerea Pers. ex Fr., gray-mold blight. N.Y. (1).
Ditylenchus dipsaci (Kuehn) Filip., stem and leaf nematode. Mass., N.Y., T.H. (1).
Erwinia carotovora (L. R. Jones) Holland, bacterial soft rot. Kans. (2).
Erysiphe cichoracearum DC., powdery mildew. Ind., Iowa, Nebr., N.J., N.Y., Ohio, Pa. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Tex. (1), Fla. (2).
?Phyllactinia corylea Pers. ex Karst., powdery mildew. Wash. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Pratylenchus pratensis (De Man) Filip., root nematode.
Protomyces pachydermus Thuem., leaf and stem gall. Utah. (1).
Pseudomonas tabaci (Wolf & Foster) Stapp, bacterial leaf spot. Wis. (1).
Puccinia hieracii (Schum.) Mart. (*P. taraxaci* (Reb.) Plowr.) (O,I,II,III), rust. General (1). Also on native species, mostly western.
Ramularia sp., leaf spot. Conn. (2).
R. lineola Pk., leaf spot. Ind., N.C., N. Dak., N.Y., Tex. (1). Doubtfully distinct from the following.
R. taraxaci Karst., leaf spot. Eastern and Central States to Colo. and Wash. (1); Iowa, Mich., Wash., Alaska (3).
Rhizoctonia solani Kuehn, root rot. Conn. (1,2), N.J. (1), Wash. (1,3).
Sclerotinia sclerotiorum (Lib.) d By., crown rot. Pa. (1).
Septoria unicolor Wint., leaf spot. Wash. (1).
Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Mass. to N.J., Mo., and Wash. (1).
Synchytrium taraxaci d By. & Wor., leaf gall. Minn. (1).
Xanthomonas taraxaci Niederhauser, bacterial leaf spot. N.Y. (2).
Yellows—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.) Tex. (1).

Tithonia

T. rotundifolia (Mill.) Blake

Shrub of Mexico and Central America, grown for ornament under glass or in the open in the Far South.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H.
Mosaic—unidentified virus. P.R.

Tragopogon

T. porrifolius L., salsify.

Biennial of southern Europe, widely grown in home gardens and truck-crop centers in the North for its edible taproot.

Albugo tragopogonis Pers. ex S. F. Gray, white-rust. General.
Cercospora tragopogonis Ell. & Ev., leaf spot. Mont., Okla.
Ditylenchus dipsaci (Kuehn) Filip., leaf and stem nematode. Calif.
Erwinia carotovora (L. R. Jones) Holland, bacterial soft rot. Conn., Tex.
Erysiphe cichoracearum DC., powdery mildew. General.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. N.Y. to Ala. and Tex.; Wash.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Rhizoctonia solani Kuehn, root rot. Tex., Wash.
Sclerotinia intermedia Ramsey and *S. sclerotiorum* (Lib.) d By., crown rot. Ill.
Sclerotium rolfsii Sacc., southern blight. Tex.
Sporodesmium scorzonerae Aderh., leaf blight. Ala., Md., N.Y., Pa., Va., W. Va.
Stemphylium botryosum Wallr. var. *tragopogoni* Linn, leaf spot. N.Y.
Verticillium albo-atrum Reinke & Berth., wilt. N.Y.
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Oreg.
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Md., N.Y., Pa., Wis. Also var. *californicus* Holmes—Calif.

Tussilago

T. farfara L., coltsfoot.

Perennial herb of Eurasia, naturalized in the Eastern and Central States, sometimes grown for ground cover.

Mycosphaerella tussilaginis (Rehm) Lindau (*Ramularia brunnea* Pk.), leaf spot. N.Y.
Septoria farfaricola Dearn., leaf spot. Tenn.

Verbesina, crownbeard

(1) *V. encelioides* (Cav.) Benth. & Hook.
(2) *V. occidentalis* (L.) Walt.
(3) *V. virginica* L.
(4) Other species.

Perennial herbs, except (1) annual, mostly in the Southeastern States to Texas; sometimes grown for ornament.

Cercospora fulvella Heald & Wolf, leaf spot. Tex. (4).
Coleosporium viguierae Diet. & Holw. (II,III), rust. Ariz. (1); Fla. (3,4); N.C. (3); Tex. (4). O and I unknown.
Colletotrichum sp., leaf and stem spot. Ariz. (1).
Erysiphe cichoracearum DC., powdery mildew. S.C. (2); Tex., Va. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Laestadia verbesinae Pat. & Gaill., on leaves. C.Z. (4).
Meloidogyne sp., root knot nematodes. Ala. (2,3).
Phyllosticta verbesinae Heald & Wolf, leaf spot. Tex. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. N. Mex., Tex. (1).
Puccinia abrupta Diet. & Holw. (II,III), rust. Tex. (1), Calif. (4). O and I unknown.
P. cognata Syd. (O,I,II,III)—Ark., La., Tenn. (3); Tex. (1,3,4).
P. verbesinae Schw. (O,I,II,III)—Md. to Ala., La., and Ind. (2).
Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot. Tex. (3).
Stachybotryella repens Ell. & Barth., on leaves. Tex. (3).

Vernonia, ironweed

(1) *V. altissima* Nutt.
(2) *V. fasciculata* Michx.
(3) *V. noveboracensis* (L.) Willd.
(4) Other species.

Tall perennials of the Eastern and Central States, and numerous species southward; sometimes grown in wild gardens.

Ascochyta treleasei Berl. & Vogl., leaf spot. Wis. (3).
Cercospora noveboracensis Ell. & Ev., leaf spot. Mo. (3).
C. oculata Ell. & Kell. and *C. vernoniae* Ell. & Kell. (questionably distinct), leaf spot. From W. Va. to Ala., Tex., Nebr., and Wis. (* and others).
Coleosporium vernoniae Berk. & Curt. (II,III), rust. General (*), also on other species within their range from Mass. to Fla., Tex., and Nebr. O and I on 2- and 3-needle pines.
Erysiphe cichoracearum DC., powdery mildew. General (*).
Mycosphaerella sp. (*Sphaerella decidua* Ell. & Kell.), leaf spot. Kans. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Mo. (3); Kans. (4).
Puccinia arthuriana Jacks. (O,II,III), rust. P.R. (4).
P. insulana (Arth.) Jacks. (O,II,III)—P.R., V.I. (4).
P. rotundata Diet. (O,III)—C.Z. (4).
P. vernoniae Schw. (O,I,II,III). Widespread (*), also on other species within their range from N.Y. to Miss., Tex., and N. Dak.
Septoria sp. (? *S. vernoniae* Syd.), leaf spot. Mo. (4).
Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Mo. (3).
Stigmella vernoniae Dearn. & Barth., black mildew. Mo. (4).

Viguiera

(1) *A. annua* (M.E.Jones) Blake, goldeneye.
(2) Other species.

Annual (1) and some perennial (2) herbs of dry plains in the Southwest; (1) a minor forage plant, perhaps of ornamental value; useful to wildlife.

Entyloma compositarum Farl., white smut. Utah (2).
Erysiphe cichoracearum DC., powdery mildew. Utah (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Puccinia abrupta Diet. & Holw. (II,III), rust. Ariz. (1), Tex. (2).
P. turgidipes Jacks. (II,III)—Ariz., Calif. (2).
Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot. Tex. (2).

Wyethia

(1) *W. amplexicaulis* Nutt.
(2) *W. angustiofolia* (DC.) Nutt.
(3) Other species.

Perennial herbs of the Rocky Mountain and Southwestern States, some of ornamental value or useful to wildlife.

Didymaria conferta Syd., leaf spot. Utah, Wyo. (1); Oreg. (2).
Marssonina wyethiae (Ell. & Ev.) Magn., leaf spot. Wash. (1), Calif. (3).
Puccinia balsamorhizae Pk. (O,I,II,III), rust. Ariz. (3), Calif. (2), Colo. (1,3), Utah (1,2,3).
Septoria wyethiae Harkn., leaf spot. Calif., Utah (3).
Tylenchus balsamophilus Thorne, leaf gall. Utah (1).

Xanthium

(1) *X. saccharatum* Wallr. (including *X. americanum* Walt., *X. canadense* Mill., *X. com-*

mune Britton, *X. orientale* L., *X. pennsylvanicum* Wallr. in American manuals), common cocklebur.
(2) *X. spinosum* L., spiny cocklebur.

Cosmopolitan annual herbs: (1) often a troublesome weed, but useful to wildlife; (2) similar, but of more southern distribution.

Albugo tragopogonis Pers. ex S. F. Gray, white-rust. Oreg. (1).
Aphelenchoides ritzema-bosi (Schmidt) Steiner & Buhrer, leaf nematode. (1).
Botrytis cinerea Pers. ex Fr., leaf spot. W. Va. (1).
Cercospora xanthicola Heald & Wolf, leaf spot. Tex., Wis. (1).
Colletotrichum xanthii Halst., on stems. N.J., Tex. (1).
Cuscuta sp., dodder. Tex. (1).
Diaporthe arctii (Lasch) Nits., on stems. Ga. (1).
Diplodia natalensis P. Evans, on stems. Ala. (1).
Erysiphe cichoracearum DC., powdery mildew. N.J. to Fla., Tex., and Wis. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H.
Mycosphaerella xanthicola (Cke. & Harkn.) Lindau, on stems. Calif. (1).
Phymatotrichum omnivorum (Shear) Dug., root knot. Tex. (1).
Plasmopara halstedii (Farl.) Berl. & DeT., downy mildew. Iowa (1).
Puccinia canaliculata (Schw.) Lagh. (O,I), rust. Pa. to Ark., N. Mex., and Nebr. (1). II and III on *Cyperus* spp.
P. xanthii Schw. (III). General (1); Ind., Mont. (2).
Rhabdospora xanthii Pk., on stems. N.Y., Tex. (1).
Septoria xanthii Desm., leaf spot. Calif., Del., N. Dak. (1).

Zinnia

(1) *Z. elegans* Jacq. (including *Z. pumila* Hort., not A.Gray), zinnia.
(2) Other species.

Annual herbs of Mexico, (1) widely grown for ornament.

Alternaria zinniae Pape, Alternaria blight. Conn., N.J., N.Y., Pa., S.C.
Aphelenchoides ritzema-bosi (Schwartz) Steiner & Buhrer, leaf nematode. Del., Mass., N.J.
Botrytis cinerea Pers. ex Fr., head blight, stem canker. Calif., Conn., N.J., Oreg., Pa., Alaska (1).
Cercospora zinniae Ell. & Martin (*C. atricincta* Heald & Wolf), leaf spot. S.C. to Fla. and Tex., also reported in Colo., Ind., Pa., P.R., and Guam (1); Ala., Fla. (2).
Choanephora sp., blossom rot. Fla., P.R. (1).
Erysiphe cichoracearum DC., powdery mildew. General (1).
Fusarium sp., stem rot, wilt (? secondary). Colo., Iowa, Mo., N.Y., Tex., Wash. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophomina phaseoli (Maub.) Ashby, charcoal stem rot. Tex. (1).
Meloidogyne sp., root knot nematodes. N.J., Pa., Tex. (1).
Paratylenchus nanus Cobb, in roots. Md. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Phytophthora cryptogea Pethyb. & Laff., stem rot, wilt. N.J. (1).
Pseudomonas solanacearum E.F.Sm., bacterial wilt. Fla. (1).
Rhizoctonia solani Kuehn, damping-off, root rot. Calif., N.J., Tex. (1).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Calif., Colo., Mass., Mont., Oreg., Pa., Wash. (1).
Sclerotium rolfsii Sacc., southern blight. Fla., N.J. (1).

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.) Calif., Idaho, Oreg., Wash. (1).

MOSAIC—unidentified virus(es). Conn., Fla., Iowa, Kans., N.J., N.Y., Okla., Wash., Wis., T.H. (1). Several strains of cucumber mosaic virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.) have been identified in naturally infected zinnias, and susceptibility to systemic infection by inoculation with the following viruses has been demonstrated: alfalfa mosaic, tobacco mosaic (green and yellow types), tobacco etch, tobacco ring spot, and turnip mosaic.

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Tex. (1).

YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Mich., Pa. (usually considered resistant to the eastern strain of this virus). Also var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.—Calif.

CONVOLVULACEAE

Argyreia

(1) *A. nervosa* Bojer
(2) *A. speciosa* Bojer

Asiatic twining perennials, grown for ornament.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ? S.C. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).

Calonyction

C. aculeatum (L.) House (*Ipomoea bona-nox* L.), moonflower.

Twining perennial of tropical America, grown in warm regions or under glass for ornament.

Albugo ipomoeae-panduratae (Schw.) Swing., white-rust. Fla.
Aphelenchoides fragariae (Ritz.-Bos) Christie (group), leaf nematode. N.J.
Coleosporium ipomoeae (Schw.) Burr. (II,III), rust. Ala., N.C., S.C., Tex. O and I on *Pinus* spp.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. N.J., ? S.C.
Phyllosticta sp., leaf spot. N.J.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Ramularia ipomoeae F. L. Stevens, leaf spot. T.H.
Sphaerulina ipomoeae F. L. Stevens, on leaves. T.H.

Convolvulus

(1) *C. arvensis* L., small bindweed.
(2) *C. sepium* L., great, or hedge, bindweed.
(3) *C. japonicus* Thunb., California-rose.
(4) Other species.

Twining perennials, introduced and widely naturalized (1,3) or endemic (2,4); (1) is a troublesome weed; (2) is useful for ground cover and to wildlife; (3) is grown for ornament.

Albugo ipomoeae-panduratae (Schw.) Swing., white-rust. N.J. to Fla., Tex., and Ill. (2); Tex., P.R. (3).
Cercospora sp., leaf spot. Kans., N.C. (2).
C. tuberculella J. J. Davis.—Wis. (2).
Coleosporium ipomoeae (Schw.) Burr. (II,III), rust. N.C. (1); Ala., Ga., Md., Tenn., Va., W. Va. (2); La., Miss. (3). O and I on *Pinus* spp.
Cuscuta gronovii Willd., dodder. N.Y. (2).
Diplodia convolvuli Dearn. & House, on stems. N.Y., Tex. (2).
Dothidella calystegiae (Cke. & Harkn.) Th. & Syd., on stems. Calif. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md. (4).
Mycosphaerella sp. (*Sphaerella harknessii* Sacc.), on stems. Calif. (3).
Parodiella paraguayensis Speg., black mildew. N.C. (1).
Phyllosticta batatas (Thuem.) Cke., leaf spot. S.C. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (*).
Physalospora obtusa (Schw.) Cke., on stems. (2).
Puccinia convolvuli (Pers.) Cast. (O,I,II,III), rust. Calif., Ind., Mass., Nebr., N.Y., Okla., Tenn., Tex. (1); Mass. to Ala., Tex., and N. Dak. (2); Calif., Oreg., V.I. (3).
Rhabdospora sp., stem rot, blight. Idaho, Wash. (1).
Rhizoctonia solani Kuehn, damping-off. Minn., Tex. (1).
Septogloeum convolvuli Ell. & Ev., leaf spot. Calif., Wis. (3).
Septoria calystegiae West., leaf spot. Wis. (1), N.Y. (2), Calif. (3).
S. convolvuli Desm.—Vt. to Md., Colo., and Wash. (2); Wis. (3). Reported also on (1) but perhaps confused with *S. septulata.*
S. flagellaris Ell. & Ev.—Mich., Miss., N.J., N.Y. (2); N.Y. (3).
S. septulata Beach.—Ill., Nev. (1); probably also Iowa, Kans., Nebr., N.J., Wis., reported as *S. convolvuli;* Wash. (3).
Stagonospora convolvuli Dearn. & House, leaf spot. N.Y. (2).
STREAK—virus (*Annulus orae* Holmes, Nicotiana virus 8 K.M.Sm.). Wis. (1).

Dichondra

(1) *D. carolinensis* Michx., lawnleaf.
(2) *D. repens* Forst.

Creeping perennials, sometimes used for ground cover and lawns in the Far South.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif. (2).
Puccinia dichondrae Mont. (I,III), rust. La., Miss., N.C., Tex. (1); Calif., Tex. (2).
Sclerotium rolfsii Sacc., southern blight. Calif. (2).
Synchytrium edgertonii Cook, leaf gall. La. (2).

Evolvulus

Evolvulus spp.

Low perennials, mostly in the Western Plains; some grown for ornament; useful to wildlife.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia lithospermi Ell. & Kell. (O,I,II,III), rust. Colo., Kans., Nebr., Tex., P.R.
STREAK—virus (*Annulus orae* Holmes, Nicotiana virus 8 K.M.Sm.). Wis. (1).

Ipomoea

I. Cultivated Perennial, Sweetpotato

Ipomoea batatas (L.) Lam., sweetpotato.

Tropical American perennial, widely cultivated for edible roots; in the United States grown in the Southern States north to New Jersey and Iowa, also Arizona, California, Washington, Hawaii, and P.R.; commercially chiefly from New Jersey to Florida, Texas, and Missouri.

Actinomyces ipomoea Person & W.J.Martin: SEE *Streptomyces ipomoea.*
Albugo ipomoeae-panduratae (Schw.) Swing., white-rust. General.
Alternaria sp. (*?A. tenuis* Nees ex Cda.), secondary leaf spot. Occasional to general, often following white-rust. Storage rot of roots, also attributed to *Alternaria,* may be caused by other species. *A. solani* (Ell. & Martin) Sor. is reported to cause foot rot in Del. and Tex.
Aspergillus spp., especially *A. niger* v. Tiegh., secondary storage rot. Occasional.
Botrytis cinerea Pers. ex Fr., gray-mold rot. On sprouts in hotbeds and in stored roots, usually after chilling. Cosmopolitan.
Ceratostomella fimbriata (Ell. & Halst.) J.A. Elliott: SEE *Endoconidiophora fimbriata.*
Cercospora sp., leaf spot. Fla., Okla., P.R. Identified doubtfully as *C. batatae* Zimm. (which occurs in Guam and the Philippine Is.); also reported as *C. ipomoeae* Wint. and *C. bataticola* Cif. & Bruner.
Choanephora cucurbitarum (Berk. & Rav.) Thaxt., leaf mold. Fla.
Coleosporium ipomoeae (Schw.) Burr. (II,III), rust. Ala., Miss., P.R. O and I on *Pinus* spp.
Diaporthe batatatis Harter & Field, dry rot of roots, stem rot. N.J. to Fla., Tex., and Mo., especially in the South. According to some authorities this is *D. phaseolorum* (Cke. & Ell.) Sacc. var. *batatatis* (Harter & Field) Wehm.
Diplodia tubericola (Ell. & Ev.) Taub. (=*D. theobromae* (Pat.) Nowell). Java black rot of roots. General, especially in the South. Conidial stage of *Physalospora rhodina* (Berk. & Curt.) Cke.
Ditylenchus dipsaci (Kuehn) Filip., brown ring of roots. N.J.
Elsinoë batatas (Saw.) Viégas & Jenkins, spot anthracnose. Guam.
Endoconidiophora fimbriata (Ell. & Halst.) Davidson, black rot of roots and stems. General.
Epicoccum sp., storage rot. Occasional after chilling.
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. Conn., S.C.
Fuligo violacea Pers., epiphytic on sprouts in hotbeds. Ala., Del., N.J., Tex.
Fusarium oxysporum Schlecht., surface rot of roots in storage. General.
F. oxysporum f. *batatas* (Wr.) Snyd. & Hans. (*F. batatatis* Wr., *F. hyperoxysporum* Wr.), stem rot, wilt. General, especially in the northern range of sweetpotato production, including the Pacific Coast and Western States; in the South on susceptible varieties. The organisms originally distinguished as *F. batatatis* and *F. hyperoxysporum* (subsequently as *F. bulbigenum* Cke. & Mass. var. *batatas* Wr. and *F. oxysporum* Schlecht. f. 2 Wr.)

may be regarded as physiological races of *F. oxysporum*, differing from races that cause surface rot. The following species have also been reported, causing secondary storage rot (end rot and some forms of dry rot): *F. culmorum* (W.G.Sm.) Sacc., *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., and *F. semitectum* Berk. & Rav. var. *majus* Wr.—all synonyms of *F. roseum* Lk. emend. Snyd. & Hans.; also *F. solani* (Mart.) Appel & Wr. and *F. javanicum* Koord. var. *radicicola* Wr.

Helicobasidium purpureum Pat., root rot. Kans., Tex.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Hypomyces ipomoeae (Halst.) Wr., on stems and roots following wilt and storage rot. Calif., Del., Md., N.J., Ohio, S.C. SEE ALSO *Fusarium solani*, some races of which have this ascigerous stage.

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot of stored roots, stem rot. N.J. to Fla., Tex., and Kans.; Calif.

Meliola clavulata Wint., and M. *malacotricha* Speg., black mildew. P.R.

Meloidogyne sp., root knot nematodes. General from N.J. to Fla., Tex., and Mo.; Calif. Porto Rico and Big-Stem Jersey types resistant.

Monilochaetes infuscans Ell. & Halst. ex Harter, scurf. General.

Mucor racemosus Fres., storage rot. Occasional after chilling. Cosmopolitan.

Nectria ipomoeae Halst.: SEE *Hypomyces ipomoeae*.

Penicillium sp., blue-mold rot. On stored roots, after chilling or wounding. Cosmopolitan.

Pestalotia batatae Ell. & Ev., on roots. Ala.

Phomopsis batatae (Ell. & Halst.) Harter & Field: SEE *Diaporthe batatatis*.

Phyllosticta batatas (Thuem.) Cke., leaf blight. Occasional, N.J. to Fla., Tex., and Kans., usually in the South.

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., N. Mex., Okla., Tex.

Physarum cinereum (Pers.) Batsch and *P. plumbeum* Fr., epiphytic on sprouts in hotbeds. Ala., Ark., Ky., Miss., N.J., Va.

Phytophthora sp., root rot. N.J., Va.

Plenodomus destruens Harter, foot rot (of stems and roots), sometimes storage rot. N.J. to Fla., La., and Iowa, Calif.

Pyrenophora terrestris (Hans.) Gorenz, J.C.Walker, & Larson, pink root. Calif.

Pythium spp., rootlet rot, mottle necrosis of mature roots, leak and ring rot in transit and storage. *P. scleroteichum* Drechs. and *P. ultimum* Trow, perhaps sometimes *P. debaryanum* Hesse, are the principal species causing mottle necrosis, reported in Calif., Del., Ind., Iowa, Md., Miss., N.C., N.J., Pa., Va., Wash.; possibly also *P. aphanidermatum* (Edson) Fitzp. and *P. splendens* Braun. *P. ultimum* especially, and sometimes other species, cause rootlet rot, widespread in seedbeds, sometimes in fields. *P. aphanidermatum* and *P. ultimum* are reported causing leak in Calif., the latter also ring rot. *P. arrhenomanes* Drechs., *P. artotrogus* (Mont.) d By., *P. irregulare* Buis., and *P. rostratum* Butl., are associated with rootlet rot in T.H.

Rhizoctonia solani Kuehn, sprout rot, rootlet rot, stem canker. Occasional in different forms, N.J. to Fla. and Tex.; Ariz., Calif., Ohio, Wash.

Rhizopus spp., soft rot, ring rot of stored roots. General. *R. stolonifer* (Ehr. ex Fr.) Lind (*R. nigricans* Ehr.) is the most common cause of soft rot at medium to low temperatures, *R. tritici* K. Saito at high temperatures.

Rotylenchus similis (Cobb) Filip., root nematode. T.H.

Schizophyllum commune Fr., dry rot of roots. N.C., P.R.

Sclerotinia sp., storage rot following chilling. N.C.

S. minor Jagger, sprout rot in seedbeds. N.J.

Sclerotium rolfsii Sacc., southern blight, cottony rot (commonly in seedbeds, sometimes in fields). General in the South (Va. to Fla., Tex., and Okla.).

Septoria bataticola Taub., leaf spot. Occasional, N.J. to Ala., Tex., and Iowa; T.H.

Sphaceloma batatas Saw.: SEE *Elsinoë batatas*.

Sphaeronema fimbriatum (Ell. & Halst.) Sacc.: SEE *Endoconidiophora fimbriata*.

Streptomyces ipomoea (Person & W.J.Martin) Waksm. & Henrici, soil rot (pox, pit). General from N.J. to Fla., Tex., and Iowa, also Ariz. and Calif. The stated distribution refers to the disease, not to this specific organism which has been reported as such only in La., Miss., and Iowa, but is believed to be identical with *Actinomyces pox* Manns & Adams (a nomen nudum) and *Actinomyces pox* Adams. Other *Actinomyces* spp. as *A. poolensis* Taub. and *A. scabies* (Thaxt.) Güssow, (=*Streptomyces scabies*), sometimes associated with soil-rot lesions, are secondary.

Trichoderma spp. (mostly *T. viride* Pers. ex Fr.), punky rot of stored roots. Del., N.C., N.J.

Verticillium albo-atrum Reinke & Berth., wilt. Calif.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett. Beta virus 1 K.M.Sm.). Oreg., Tex.

FEATHERY MOTTLE—virus (*Flavimacula ipomoeae* Doolittle & Harter). Md. (in experimental plants).

INTERNAL CORK—unidentified virus. Ga., La., Md., Miss., N.C., S.C., Tenn., Va.

MOSAIC—suspected but unconfirmed virus. Occasional on Nancy Hall var., Va. to Fla., Tex., and Kans.; Iowa, N. Mex. Infection with a virus believed to be a strain of cucumber mosaic virus (*Marmor cucumeris* Holmes) has been reported in Fla. Variegation of genetic origin occurs occasionally.

FASCIATION (flat and ring types)—physiological, perhaps due to over-nutrition. Occasional.

INTERNAL BREAKDOWN (of stored roots)—physiological, perhaps resulting from chilling. Ala., Ark., La.

INTERNAL BROWN SPOT—boron deficiency. In experimental plots. S.C.

INTUMESCENCE (leaf overgrowths ? raised veins)—physiological, attributed to high water intake and retarded transpiration. Occasional.

II. Other Perennial Species

(1) *Ipomoea leptophylla* Torr., bush morning-glory.

(2) *I. pandurata* (L.) G.F.W.Mey., wild sweet-potato-vine.

(3) *I. pes-caprae* (L.) Roth

(4) Other species.

Tuberous-rooted perennials, endemic in the Far South and tropical America, (1) and (3) also ranging into the Eastern and Central States. All of ornamental value and sometimes cultivated; (3) a persistent weed; (4) a good soil binder.

Albugo ipomoeae-panduratae (Schw.) Swing., white-rust. Colo., Kans., Tex. (1); N.J. to Fla., Ariz., and Nebr. (2); P.R., V.I. (3); Guam (4).

Cercospora ipomoeae Wint., leaf spot. Fla., Ill., Miss., Mo. (2): Tex., P.R. (3).

C. viridula Ell. & Ev.—Ga. (4).

Coleosporium ipomoeae (Schw.) Burr. (II,III), rust. N.J. to Ala., Okla., and Kans. (2); Fla., Miss., Tex., P.R. (4).

Cylindrosporium bakeri Sacc., leaf spot. Guam (4).

Fusarium sp., wilt. Tex. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H. (3), Fla. (4).
Meliola clavulata Wint. and *M. malacotricha* Speg., black mildew. P.R. (4).
Phlyctaena ipomoeae Ell. & Ev., on stems and sepals. W. Va. (2).
Phomopsis sp., leaf spot. T.H. (3).
Phyllosticta ipomoeae Ell. & Kell., leaf spot. Fla., Kans., Miss., W. Va. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).
Sphaeropsis ipomoeae Ell. & Ev., on stems. W. Va. (2).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett. Beta virus 1 K.M.Sm.). Tex. (2,4).

III. Cultivated Annuals, Morning Glories

(1) *Ipomoea hederacea* (L.) Jacq., ivyleaf morning-glory.
(2) *I. nil* (L.) Roth, white-edge morning-glory.
(3) *I. purpurea* (L.) Lam., common morning-glory.
(4) *I. tricolor* Cav.
(5) Other species.

In improved forms, the annual morning-glories of floriculture, natives of tropical America; (1) widely and (3) locally naturalized in the United States, especially (1) becoming a weed.

Albugo ipomoeae-panduratae (Schw.) Swing., white-rust. N.J. to Ala., Ariz., and Nebr. (1,2,3,5).
Alternaria sp., secondary leaf spot. Va. (3).
Cercospora alabamensis Atk., leaf spot. Fla. (1), Ala., N.J. (3).
C. ipomoeae Wint.—Kans., Mo., Tex. (1); Ala., Mo., Ohio (3); P.R. (5).
C. viridula Ell. & Ev.—Ill., Ind., N.C., Nebr., N.J., Tex., Va. (3).
Choanephora conjuncta Couch, blossom rot. Ga. (3).
Coleosporium ipomoeae (Schw.) Burr. (II,III), rust. N.J. to Fla., Tex., and Kans., also throughout tropical America (1,2.3,5).
Diaporthe arctii (Lasch) Nits., on stems. W. Va. (3).
Fusarium sp., wilt. Tex. (1).
Glomerella cingulata (Ston.) Spauld. & Schrenk, on stems. La. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meliola clavulata Wint., black mildew. P.R. (5).
Meloidogyne sp., root knot nematodes. Ala., Okla. (3); T.H. (5).
Pellicularia koleroga Cke. (*Corticium stevensii* Burt), thread blight. Fla. (5).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,3,5).
Puccinia crassipes Berk. & Curt. (I,III), rust. Fla., Ga., La., S.C., Tex., P.R., V.I. (5).
Sclerotium rolfsii Sacc., southern blight. Tex. (3).
Septoria convolvuli Desm., leaf spot. Kans., Tex. (1); Fla., Pa., Wis. (5).
Uredo laeticolor Arth. (II), rust. Fla. (5).
Vermicularia ipomoearum Schw., stem canker. N.Y., Pa. (3).
MOSAIC—suspected virus. P.R. (2); Fla. (5). Infection in the field and also by artificial inoculation of (3) with a strain of cucumber mosaic virus (*Marmor cucumeris* Holmes) has been reported in Fla.

Jacquemontia

Jacquemontia spp.

Twining herbs of tropical America and the Far South; sometimes grown for ornament.

Albugo ipomoeae-panduratae (Schw.) Swing., white-rust. On *J. tamnifolia* (L.) Griseb. in Ala. and *J. nodiflora* (Des.) G. Don. in P.R.
Cercospora alabamensis Atk., leaf spot. Miss.
Coleosporium ipomoeae (Schw.) Burr. (II, III), rust. La., P.R. On *J. tamnifolia.*
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Ala.
Rotylenchus reinformis Linford, root nematode. Ga.
Uromyces gemmatus Berk. & Curt. (O,II,III), rust. P.R., V.I. On *J. nodiflora.*

Quamoclit, cypressvine

(1) *Q. coccinea* (L.) Moench
(2) *Q. pennata* Bojer

Twining herbs of tropical America, grown for ornament and sparsely naturalized in the Southern States, occasionally northward; useful to wildlife.

Albugo ipomoeae-panduratae (Schw.) Swing., white-rust. N. Mex. (1), Miss. (2).
Coleosporium ipomoeae (Schw.) Burr. (II,III), rust. Ill., S.C., Tenn., P.R., V.I. (1); Miss., N.C. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Ala. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Puccinia crassipes Berk. & Curt. (I,III), rust. V.I. (1).
Vermicularia ipomoearum Schw., on stems. Pa. (1).

CORNACEAE

Aucuba

A. japonica Thunb.

Evergreen shrub of eastern Asia, cultivated for ornamental foliage and fruit (especially the var. *variegata* Dombr., golddusttree) under glass or in the open in the South.

Colletotrichum pollaccii Magnaghi, leaf spot. Miss., N.J. Probably a form of the following.
Gloeosporium sp. (*?Glomerella cingulata* (Ston.) Spauld. & Schrenk), anthracnose. N.J., Pa., S.C.
Pestalotia aucubae White, secondary leaf spot. N.J. *Pestalozzia aucubae* Gutner has priority.
Phomopsis sp. (*?P. aucubae* (West.) Trav.), on twigs, ?dieback. S.C.
Phyllosticta aucubae Sacc. & Speg. (=*Ascochyta?*), leaf spot. Calif., Miss., S.C.
P. aucubicola Sacc.—Conn.
Verticillium albo-atrum Reinke & Berth., wilt. N.J.

Cornus, cornel, dogwood

I. Trees

(1) *Cornus florida* L., flowering dogwood, including f. *rubra* West., pink dogwood. Range 20,22,23,24,25,27,28,29,30. A small

tree, extensively cultivated in several horticultural forms; zone 4.

(2) *Cornus nuttallii* Audub., Pacific dogwood. Range 1,2,3,4,5. Similar to *C. florida* but larger, cultivated for ornament and shade; zone 7.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Mo. (1).

Armillaria mellea Vahl ex Fr., root rot. N.Y. (1), Wash. (2).

Ascochyta cornicola Sacc., leaf spot. N.C., Va. (1).

Botryosphaeria sp. (*?B. ribis* (Tode ex Fr.) Gross. & Dug.), canker. Pa. (1).

Botrytis cinerea Pers. ex Fr., flower and shoot blight. Md., Mass., N.J., N.Y. (1).

Cercospora cornicola Tracy & Earle, leaf spot. N.C. to Fla. and Tex. (1).

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1).

Corticium galactinum (Fr.) Burt, root rot. Va. (1).

Cryptostictis sp., canker, dieback. N.J. (1).

Curreya corni Dearn., on dead branches. Ky. (1).

Cytospora sp., canker. N.J. (1).

Daedalea confragosa Bolt. ex Fr., wood rot. Md., N.C., Pa., Tenn., Va., W. Va. (1).

Daldinia vernicosa (Schw.) Ces. & De N., wood rot. Md. (1).

Diaporthe eres Nits., on dead branches. Ga. (1).

Discosia artocreas Tode ex Fr., on fallen leaves. Va., W. Va. (1).

Elsinoë corni Jenkins & Bitanc., spot anthracnose on leaves, twigs, floral bracts, and seeds. Del., Ga., Md., N.C., S.C., Va. (1).

Fomes igniarius (L. ex Fr.) Kickx, heart rot. Oreg. (2).

F. scutellatus (Schw.) Cke., on dead wood. Md. (1).

Gloeosporium sp., leaf spot. N.J. (1).

Hypoxylon rubiginosum Pers. ex Fr., and *H. serpens* Pers. ex Fr., on dead wood. Ga., Va. (1).

Lenzites betulina L. ex Fr., wood rot. N.C. (1).

Melanconis corni Wehm. and *M. sudans* (Berk. & Curt.) Wehm., on dead branches and twigs. Ga. (1).

Mycosphaerella corni (Schw.) J.H.Miller, on fallen leaves. Ala., Ga., S.C. (1).

Myxosporium everhartii Sacc. & Syd., on dead twigs. Mich., Tenn. (1).

Nectria galligena Bres., trunk and branch canker. Oreg., Wash. (2).

Nummularia clypeus (Schw.) Cke., on dead branches. Ind. (1).

Pellicularia koleroga Cke., thread blight. Fla. (1).

Pezicula corni Petr., on twigs and branches, ?twig blight. Mass., ?Md., Pa. (1).

Phoma florida Dearn. & House, on dead twigs. N.Y. (1).

Phomopsis sp. (*?P. corni* (Fckl. ex Sacc.) Trav.), on dead twigs. Md., Tenn. (1).

Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla. (1).

Phyllactinia corylea Pers. ex Karst., powdery mildew. Md. to Ala., Mo., and Mich. (1); Calif., Idaho, Oreg., Wash. (2).

Phyllosticta spp., leaf spot: Pa. to Va., Tenn., and Kans. Variously reported as *P. corni* West., *P. cornicola* (DC. ex Fr.) Rab., *P. globifera* Ell. & Ev., *P. taurica* Maire, and *P. starbaeckii* Sacc. & Syd., perhaps indistinguishable. *P. cornicola* has priority. Associated with *Septoria cornicola*.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).

Physalospora obtusa (Schw.) Cke., on branches. N.J., N.Y., Va. (1).

P. rhodina (Berk. & Curt.) Cke.—La. (1).

Phytophthora cactorum (Leb. & Cohn) Schroet., trunk canker, collar rot. Md., Mass., N.J., N.Y. (1); Wash. (2).

Placosphaeria cornicola Dearn., on leaves. Oreg. (2).

Polyporus spp., wood rot, usually on dead trunks and branches, sometimes sapwood or heart rot of living trees: *P. adustus* Willd. ex Fr.—N.Y.; *P. albellus* Pk.—Va.; *P. dichrous* Fr.—Md.; *P. tulipiferus* (Schw.) Overh.—Md.; *P. versicolor* L. ex Fr.—Md., Va.

Poria spp., wood rot: *P. pulchella* (Schw.) Cke.—Md.; *P. semitincta* (Pk.) Cke.—Md.; *P. unita* (Pers.) Cke.—Md.; *P. versipora* Pers. ex Rom.—Md., Pa.

Pythium sp., root rot of nursery plants. N.J. (1).

Septobasidium spp., brown felt (on scale insects on twigs). Numerous species reported from Va. to Fla.: *S. apiculatum* Couch, *S. cokeri* Couch, *S. curtisii* (Berk. & Desm.) Boed. & Steinm., *S. fumigatum* Burt, *S. leprosum* Couch, *S. pseudopedicellatum* Burt, and *S. sinuosum* Couch.

Septoria cornicola Desm., leaf spot. N.Y. to Ga. and Iowa (1).

S. corni-mas Sacc.—Mo., N.Y., W. Va. (1).

S. floridae Tehon & Daniels—Ill. (1).

Sphaeropsis sp., twig blight. N.J. (1).

S. parallela Dearn. & House: SEE *Physalospora obtusa*.

Stereum purpureum Pers. ex Fr., on dead wood. N.Y. (1).

S. versiforme Berk. & Curt.—N.Y. (1).

Trematosphaeria cornina Dearn., on dead branches. Ky. (1).

Valsa ambiens Pers. ex Fr. and *V. coronata* Hoffm. ex Fr., on dead branches. W. Va. (1).

II. Shrubs or Small Trees

(1) *Cornus alternifolia* L.f., pagoda dogwood. Range 22,23,24,25,26,27,29.

(2) *C. asperifolia* (Michx.) Small, roughleaf cornel. Range 17,20,21,22,23,24,25,27,28, 29,30.

(3) *C. occidentalis* Cov., western osier. Range 1,2,3,4,7,12,13.

(4) *C. racemosa* Lam., gray dogwood. Range 21,22,23,24,25,26,27,28,29.

(5) *C. stolonifera* Michx., red-osier dogwood. Range throughout most of the U.S.

(6) Other species.

Mostly native shrubs, sometimes cultivated, especially (4) and (5); useful for erosion control and wildlife; also a few introduced species, cultivated for ornament.

Apioporthe corni Wehm., (*Zythia aurantiaca* (Pk.) Sacc.) on branches. Iowa, Mich., N.Y., W. Va., Wis. (1,5); Colo. (3).

Ascochyta cornicola Sacc., leaf spot. Ohio, Wis. (6).

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches. Pa. (6).

Botrytis cinerea Pers. ex Fr., bud blight, shoot-tip blight. Mass. (4).

Calosphaeria cornicola Ell. & Ev., on branches. N.Y. (1,4).

Cercospora corni J.J.Davis, leaf spot. Wis. (4,6); La. (6).

C. cornicola Tracy & Earle—Tex. (2).

Coryneum cornicola Ell. & Ev., on twigs. Mich. (4,6).

Cryptosporiopsis cornina (Pk.) Petr. & Syd., on branches. Colo., Nebr., N. Mex. (5); Md., N.Y., Pa. (6).

Cylindrosporium corni Solheim, leaf spot. Wyo. (5).

Cytospora corni West., on twigs, ?dieback. Kans. (2); Alaska (6).
Dermatea corni Phil. & Harkn., and other species on Cornus: SEE *Pezicula.*
Diaporthe eres Nits. (*D. cornicola* Ell. & Holw.), on twigs, ?canker. Iowa (4).
D. pardalota (Mont.) Fckl.—Conn., Md., Mass., Minn., N. Dak., N.Y. (4,5,6).
Dimerosporium pulchrum Sacc., sooty mold. N.Y. to Ala., Tex., and Wis. (4 5,6). Obsolete name, also reported in the conidial stage, *Sarcinella heterospora* Sacc.
Erysiphe tortilis Wallr. ex Fr. (*Trichocladia tortilis* (Fr.) Neger) powdery mildew. Reported in Mo. on cultivated *C. sanguinea*, perhaps *Phyllactinia.*
Gloeodes pomigena (Schw.) Colby, on twigs. Ind. (1,6).
Hendersonia fiedleri West., on twigs. N.Y. (1,6).
Macrophoma cornina (Pk.) Sacc. and *M. paniculata* (Ell. & Dearn.) Sacc. & Syd.: SEE *Cryptosporiopsis cornina.*
Meliola nidulans (Schw.) Cke., black mildew. Gulf States to N.C. and Tenn. (4,6).
Metasphaeria fiedleri (Niessl) Sacc., on dead twigs. N.Y. (6).
Microsphaera alni DC. ex Wint., powdery mildew. Mass. to N.C., Ill., and Wis. (1,4,5,6).
Monilinia corni (Reade) Honey, shoot-tip blight. N.Y., Wis. (6).
Mycosphaerella cornicola Tehon & Daniels, on twigs. Ill. (5).
Myxosporium nitidum Berk. & Curt., twig blight. Maine to Tenn. and Wis. Reputed to be the conidial stage of *Diaporthe albocarnis;* in part = *Apioporthe corni.* Other *Myxosporium* spp. are associated with *pezicula* spp.
Nectria cinnabarina Tode ex Fr., on twigs and branches. Md. (6).
N. coccinea Pers. ex Fr.—Oreg. (6).
Pellicularia koleroga Cke., thread blight. La. (2).
Pezicula corni Petr., on twigs, ?dieback. Idaho (1,5); Calif., Oreg. (5,6). *P. cornicola* Seaver—Mass., N.Y. (6). With each of these a *Myxosporium* sp. associated. Also *Pezicula* sp.—Ala., Md. (6).
Phoma corni Fckl. ex Sacc., *P. cornina* Pk.: SEE *Phomopsis and Cryptosporiopsis.*
Phomopsis corni (Fckl. ex Sacc.) Trav: SEE *Diaporthe pardalota.*
?Phyllachora subcuticularis (Schw.) Sacc., tar spot. N.Y. (6).
Phyllactinia corylea Pers. ex Karst., powdery mildew. General (*).
Phyllosticta cornicola (DC. ex Fr.) Rabh. (*P. globifera* Ell. & Ev.), leaf spot. General (*). Associated with *Septoria cornicola.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,6).
Physalospora everhartii Sacc. (=*P. obtusa?*), on branches. Colo. (3).
P. obtusa (Schw.) Cke.—Ga., N.Y., Va. (6).
Ramularia gracilipes J.J.Davis, leaf spot. Wis. (1).
R. stolonifera Ell. & Ev.—Wis. (1,5.6), Wash. (5).
Septobasidium spp., brown felt: *S. apiculatum* Couch—Va. to Ark. and La. *S. fumigatum* Burt—Fla. *S. pseudopedicellatum* Burt—Ala., Ga., N.C.
Septoria cornicola Desm., leaf spot. General (*).
Sphaeropsis cornicola Dearn., on twigs. Md. (6).
S. cornina Pk.: SEE *Cryptosporiopsis cornina.*
Stagonopsis pallida (Berk. & Curt.) Sacc., on twigs. Wis. (4).
Valsa ambiens Pers. ex Fr., on twigs. N.Y. (6).
V. cornina Pk.—Kans. (2), N.Y. (4), Mich. (6).
Venturia clintonii Pk., on overwintered leaves. N.Y. (6).
Zythia aurantiaca (Pk.) Sacc.: SEE *Apioporthe corni.*

III. Low Woody Herb

Cornus canadensis L., dwarf cornel, bunchberry.

Ranging throughout the Northern States to Alaska; sometimes grown in wild gardens; useful to wildlife.

Ceratobasidium anceps (Bres. & Syd.) Jacks., leaf rot. N.H.
Discohainesia oenotherae (Cke. & Ell.) Nannf., leaf and stem spot. Maine, N.H.
Glomerularia corni Pk., leaf spot. Maine to Wis.; Oreg.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Wash.
Phyllosticta sp., leaf spot. N.Y.
Puccinia porphyrogenita Curt. (III), rust. Maine to Wash. and Alaska.
Ramularia sp., leaf spot. N.Y.
Septoria canadensis Pk., leaf spot. Maine, Wash., Alaska.
Venturia clintonii Pk., on leaves. Alaska.

Garrya, tasseltree, silktassel-bush

(1) *G. elliptica* Dougl. Range 1,4.
(2) *G. flavescens* S.Wats. Range 4,5,9,10,11,13.
(3) *G. veatchii* Kellogg. Range 1,4,5.

Evergreen shrubs or small trees, sometimes grown for ornament, also browsed by livestock and wildlife.

Aphanostigme lanugine Miller & Bonar, on leaves. Calif. (1).
Cercospora garryae Harkn., leaf spot. Calif. (1).
C. glomerata Harkn.—Calif. (1).
Ceuthospora foliicola (Lib.) Cke., on dead leaves. Calif. (1).
Dasyscypha tautilla (Cke. & Harkn.) Sacc., on fallen leaves. Calif. (1).
Dothichiza garryae Bonar, leaf spot. Calif. (1,2).
Harknessiella purpurea (Phil. & Harkn.) Sacc., on leaves. Calif. (1).
Lembosia lucens (Harkn.) Sacc., ? sooty mold. Calif. (1).
Phyllosticta garryae Cke. & Harkn., leaf spot. Calif. (1), Tex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Podosporiella humilis Ell. & Ev., on leaves. Calif. (3).

Nyssa, tupelo

(1) *N. aquatica* L., water tupelo. Range 25, 29,30.
(2) *N. ogeche* Marsh., sour tupelo. Range 29, 30.
(3) *N. sylvatica* Marsh., black tupelo, black gum; including var. *biflora* (Walt.) Sarg., swamp black gum. Range 20,22,24,25,26, 27,28,29,30.

Large forest trees furnishing commercially important wood, especially (1) and (3); locally an important honey plant (2); useful to wildlife.

Actinopelte dryina (Sacc.) Hoehn., leaf spot. Ala., Ill., Okla., Va. (3).
Aplopsora nyssae Ell. & Tracy (II,III), rust. Ky., Tex. (1); Miss. (1,2); Ala., Md., S.C., Va. (3).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches. Pa. (3).

Ceratostomella spp., on dead wood: *C. cirrhosa* (Pers. ex Fr.) Sacc.—N.J. (3); *C. nyssicola* (*nyssaecola*) (Berk. & Curt.) Sacc.—Pa. (3); *C. rostrata* (Fr.) Sacc.—N.J. (3).
Cercospora nyssae Tharp, leaf spot. Tex. (3).
Ciboria nyssogena (Ell.) Sacc., on fallen fruits. N.J. (3).
Cornularia hispidula (Ell.) Sacc., on bark of saplings. N.J., Pa. (3).
Cryptodiaporthe paulula (Cke. & Ell.) Wehm., on twigs. Ala., Ga., N.Y. (3).
Daedalea confragosa Bolt. ex Fr., wood rot. Ind. (3).
D. unicolor Bull. ex Fr.—Va. (3).
Daldinia vernicosa (Schw.) Ces. & De N., wood rot. Mass., Va. (3).
Didymella segna (Cke. & Ell.) Sacc., on twigs. N.J. (3).
Discohainesia oenotherae (Cke. & Ell.) Nannf., on leaves. Va. (3).
Endoconidiophora moniliformis (Hedgc.) Davidson, blue stain. Ark., La. (1,3).
E. virescens Davidson—Fla. to La. (1).
Fomes applanatus (Pers. ex Wallr.) Gill., white mottled butt rot. Md., Va. (3).
F. connatus (Weinm. ex Fr.) Gill., white spongy rot. Mass., Pa. (3).
F. fraxineus (Bull. ex Fr.) Cke.—Ark., La. (3).
F. geotropus Cke.—Fla. (3).
F. robustus Karst.—Ga. (3).
Fomitiporia earleae Murr., wood rot. Fla. (2).
Gnomoniella georgiana J.H.Miller & G.E.Thompson, on leaves. Ga. (2,3).
Hericium erinaceus (Bull. ex Fr.) Pers., white spongy heart rot. N.C. (3).
Hypoxylon spp., on dead branches; distribution cosmopolitan or as stated: *H. deustum* (Hoffm. ex Fr.) Grev. (*Ustulina vulgaris* Tul.); *H. fuscum* Pers. ex Fr.; *H. perforatum* (Schw.) Curt.—Ala. (3); *H. rubiginosum* Pers. ex Fr.; *H. tinctor* (Berk.) Cke.—Ga.
Lasiosphaeria pezizula (Berk. & Curt.) Sacc., wood stain. La.
Lentinus crinitus L. ex Fr., wood rot. Ala. (1).
L. tigrinus Fr.—La., Miss. (1,3).
Lenzites betulina L. ex Fr., wood rot. La. (1); Ind., Md., Tex. (3).
Melanconis sudans (Berk. & Curt.) Wehm., on dead branches. Ga., N.J. (3).
Mycosphaerella nyssicola (*nyssaecola*) (Cke.) Wolf, leaf spot. Ala. (1); Ga. (*); Fla., Mich., N.C., N.Y., Pa., S.C., Va., W. Va. (3).
Myriangium duriaei Mont. & Berk., on scale insects on branches. Md. to Fla. and La. (*).
Nectria galligena Bres., trunk and branch canker. Conn. (3).
Neopeckia diffusa (Schw.) Starb., on dead wood. Ga. (3).
Pellicularia koleroga Cke., thread blight. La. (1).
Phoma nyssicarpa (*nyssaecarpa*) Cke., on branches. W. Va. (3). On fruits. S.C. (1).
Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla., Ind., Md., Tex. (3).
Phyllosticta nyssae Cke.: See *Mycosphaerella nyssicola.*
Phytophthora cactorum (Leb. & Cohn) Schroet., seedling wilt. Mo. (3).
Pleurotus ostreatus Fr., wound rot, sapwood rot. La., Miss. (1,3).
Polyporus spp., wood rot, usually of dead trunks and branches; distribution cosmopolitan or as indicated: *P. adustus* Willd. ex Fr.; *P. distortus* Schw. ex Fr.—Ind. (3); *P. galactinus* Berk.—Tenn. (3); *P. hirsutus* Wulf. ex Fr.; *P. mutabilis* Berk. & Curt.—Ark., La. (1,3); *P. pargamenus* Fr.; *P. resinosus* Schrad. ex Fr.—Ind. (3); *P. rhipidium* Berk.—Ala. (1); *P. rigidus* Mont.—Ark., La., Miss. (1,2); *P. sanguineus* L. ex Fr.—La. (1); *P. versicolor* L. ex Fr.
Poria spp., wood rot, usually on dead branches and trunks: *P. ambigua* Bres.—Fla. (2); *P. semitincta* (Pk.) Cke.—Ind. (3); *P. versipora* Pers. ex Rom.—Ind., Mich., Pa. (3).
Roselinia corticium (Schw.) Sacc., on dead branches. Ala.
Rutstroemia renispora (Ell.) White, on fallen leaves. Pa., S.C., Va. (3).
Schizophyllum commune Fr., wood rot. Cosmopolitan.
Septobasidium spp., brown felt (on scale insects infesting twigs): *S. curtisii* (Berk & Desm.) Boed. & Steinm.—N.J. to Fla. and Miss. (3); *S. fumigatum* Burt—Miss.; *S. langloisii* Pat.—Fla., La.; *S. patouillardi* Burt—Miss.; *S. pseudopedicellatum* Burt—Ala., Fla.; *S. rugulosum* Couch—Fla.; *S. sinuosum* Couch—Fla.
Stagonospora nyssicola (*nyssaecola*) Fairm., on twigs. N.Y. (3).
Steccherinum ochraceum (Pers. ex Fr.) S.F.Gray, wood rot. La., Miss., Pa. (3).
Stereum spp., wood rot, usually of dead branches, sometimes heart rot of living trees: *S. fuscum* Schrad. ex Quél.—La. (1); *S. hirsutum* Willd. ex Fr.—N.Y.; *S. lobatum* (G.Kunze) Fr.—Miss. (1); *S. purpureum* Pers. ex Fr.—Ind.; *S. rameale* Schw.—Ind., La., Miss., Ohio.
Strumella coryneoidea Sacc. & Wint., trunk canker. Pa., Va. (3). Conidial stage of *Urnula craterium* (Schw.) Fr.
Tryblidiella rufula (Spreng. ex Fr.) Sacc., on dead branches. Fla., Ga. (*).
Valsa nussae Cke., on twigs and branches. N.Y., S.C., W. Va. (3).

CRASSULACEAE

Bryophyllum

See *Kalanchoë.*

Crassula

(1) *C. argentea* L.
(2) Other species.

Fleshy-leaved shrub of South Africa, grown as a pot plant under glass, or in the open in California (1); or various succulent herbs and shrubs of similar origin and use.

Armillaria mellea Vahl ex Fr., root rot. Calif. (1).
Diplodia crassulae Cke. & Harkn., on stems. Calif. (2).
Gloeosporium sp. (*?Glomerella cingulata* (Ston.) Spauld. & Schrenk), anthracnose. N.J. (2).
Phomopsis sp., leaf spot. Conn. (2).
Pythium sp., root rot. N.J., N.Y. (2).

Echeveria

Echeveria spp.

Rosettelike succulent herbs of southern California and Mexico, grown for ornament.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif.
Puccinia echeveriae Linder (III), rust. Calif. (on *E. caespitosa* (Haw.) DC. and *E. farinosa* Lindl.).

Kalanchoë

(1) *K. daigremontiana* Hamet. & Perrier
(2) *K. laciniata* DC. (*K. carnea* Mast., *K. coccinea* Welw.)
(3) *K. pinnata* Pers. (*Bryophyllum calycinum* Salisb.)

Succulent herbs and subshrubs of southern Asia and Africa, grown for novelty and ornament under glass, (2) becoming naturalized in southern Florida, and (3) widely naturalized in tropical America.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Widely used as experimental subject (1,3).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on stems. T.H. (3).
Diplodia natalensis P.Evans, stem rot. Ala. (3).
Fusarium sp., stem rot, wilt (?secondary). N.J. (2).
Omphalia flavida Maubl. & Rangel, leaf spot. P.R. (3).
Phytophthora ?cactorum (Leb. & Cohn) Schroet., crown rot. N.J., N.Y. (2).
P. parasitica Dast., leaf rot. P.R.
Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Md., N.J. (2).

Sedum, stonecrop

I. Cultivated Species

(1) *Sedum acre* L.
(2) *S. spectabile* Boreau
(3) *S. telephium* L., including the var. *purpureum* Lk., liveforever.
(4) Other species.

Succulent herbs, mostly natives of Europe and Asia, grown as rock-garden and house plants, sometimes locally naturalized and weedy.

Cercospora sedi Ell. & Ev., on leaves. Ala. (4).
?Colletotrichum sp. (*Vermicularia beneficiens* Pk.) stem rot. Va. (1), N.Y. (3).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.—(3,4).
Phytophthora sp., stem rot. N.Y. (3).
Pleospora sp., leaf spot. N.Y. (3).
Rhizoctonia solani Kuehn, stem rot. Ill., N.J. (2,4).
Sclerotium rolfsii Sacc., southern blight. Kans., N.J., Va. (1).
Septoria sedi West., leaf spot. Maine, N.Y. (1); Ill., Iowa (2); N.Y., Vt., Wis. (3).
Sphaeronema minutulum D.Sacc., on stems. N.Y. (2).
Vermicularia beneficiens Pk.: See *Colletotrichum.*

II. Native Species

Sedum spp.

Succulent herbs, mostly in the West, Montana to Colorado and on the Pacific coast; some of ornamental value or minor honey plants; useful to wildlife.

Diplodia sedicola Cke. & Harkn., on stems. Calif.
Puccinia rydbergii Garrett (III), rust. On *S. debile* Wats. and *S. stenopetalum* Pursh in Utah.
P. umbilici Guep. (III). On *S. integrifolium* in Colo. and Wyo.

Sempervivum

(1) *S. tectorum* L., houseleek.
(2) Other species.

Succulent herbs, mostly of Europe, grown as rock-garden and house plants.

Endophyllum sempervivi (Alb. & Schw.) d By. (III), rust. Mass., N.J., N.Y. (1,2).
Phytophthora parasitica Dast., stem and leaf rot. N.Y. (2).
Pythium sp., root rot. Iowa (1).

CRUCIFERAE

Alyssum

(1) *A. argenteum* Vitm., yellowtuft.
(2) *A. saxatile* L., goldentuft.

Tufted or mat-forming perennial herbs of Europe, grown in rock gardens. (For sweet alyssum see *Lobularia.*)

Plasmodiophora brassicae Wor., clubroot. N.J. (2).
Rhizoctonia solani Kuehn, damping-off. N.J. (1,2).

Arabis

Arabis spp., rockcress.

Mostly low perennials of rocky or alpine habitats in the North and West; some (*A. albida* Stev., *A. alpina* L.) grown for ornament; useful to wildlife.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. N.Y. to Va., Tex., Colo., and Wash. (*).
Botrytis cinerea Pers., gray-mold blight. Wash.
Cornularia sphaeroidia (Ell.) Sacc., on stems. Utah.
Mycosphaerella cruciferarum (Fr.) Lindau, on capsules. ?Mass.
Peronospora parasitica Pers. ex Fr., downy mildew. Ala., Colo., Ind., Mich., Tex., Wis., Alaska (*). The authority for the name is d By. if based on the perfect stage. The form on *A. virginica* in Ala. has also been identified as *P. lepidii* (McAlp.) G.W.Wils.; that on *A. oxyphylla* in Colo. as *P. arabidis oxyphllae* Gäum.
Phlyctaena andersoni Ell., on stems. Mont.
Phoma sp., on stems and capsules. Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia holboelli (Hornem.) Rostr. (O,III), rust. On numerous native species, but not those commonly cultivated in the Rocky Mountain and Pacific Coast States to Alaska.
P. monoica (Pk.) Arth. (O,I), rust. On numerous native species, Wis. to Colo. and N. Mex., Calif., and Wash. II and III on *Koeleria* and *Trisetum.*
Pyrenophora depressa Pk., on stems. Calif.
Rhizoctonia solani Kuehn, damping-off. N.J.
Septoria arabidis Sacc., leaf spot. Tex. Also var. *macrospora* Solheim—Colo.

Armoracia

A. rusticana Gaertn., Mey. & Scherb., horseradish.

Coarse perennial of Eurasia, widely grown as an esculent; commercial cultivation mainly in the Middle West and Pacific Northwest; also escaped and locally naturalized.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall, ? fasciation. N.J., N.Y.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust (white blister). Mass. to N.J., Okla., N. Mex., and Mont.; probably general.

Alternaria brassicae (Berk.) Sacc., gray (small) leaf spot. Conn. to N.J., Iowa, and Tex. Also reported as *A. herculea* (Ell. & Martin) J.A.Elliott.

A. oleracea Milbrath, black leaf spot. Conn. to N.J., Tex., and Nebr.; also Utah. The more familiar name *A. circinans* (Berk. & Curt.) Bolle, based on *Macrosporium circinans*, is of doubtful standing though widely used; *A. oleracea* appears to be the first allocation to this genus of the species that definitely causes this disease, but the name *A. brassicicola* (Schw.) Wiltsh. based on *Helminthosporium brassicola* Schw. also has been proposed.

Cercospora armoraciae Sacc., leaf spot. General.

Erwinia carotovora (L.R.Jones) Holland, soft rot of stored roots, bacterial root rot. Conn., N.J., N.Y., Okla.

Erysiphe polygoni DC., powdery mildew. Calif.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Ill., Miss., Okla.

Pellicularia filamentosa (Pat.) Rogers (*Rhizoctonia solani* Kuehn), root rot of stored roots, also collar rot in the field. Ill., Mich., Minn., N.J., N.Y., Tex., Wash. The basidial stage occasionally occurs on basal stems and leaves.

Penicillium hirsutum Dierckx, root pitting, blue-mold rot of stored roots. Ill., N.J.

Peronospora parasitica Pers. ex Fr., downy mildew. Ala., Ill., N.J., S. Dak., Wis. Also identified, at least in part, as *P. cochleariae* Gäum. See note under *Arabis*.

Phyllosticta decidua Ell. & Kell., secondary leaf spot. Tex., Wash., Wis.

P. orbicula Ell. & Ev.—N.Y.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Plasmodiophora brassicae Wor., clubroot. Ill.

Ramularia armoraciae Fckl., pale leaf spot. General.

Rhizoctonia solani Kuehn: See *Pellicularia filamentosa*.

Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Kans., N.J.

Verticillium albo-atrum Reinke & Berth., wilt. Mich., Wash.

Xanthomonas campestris (Pam.) Dows. var. *armoraciae* (McCul.) Starr & Burkh., bacterial leaf spot. Conn., Ill., Iowa, Md., Mo., S. Dak., Va.

X. phaseoli (E.F.Sm.) Dows., associated with bacterial root rot, perhaps a causal factor in this and also leaf spot. Ill.

Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.), Calif., Oreg., Wash.; ? Utah; probably Ill. and Kans. as cause of brittle root.

Mosaic—unidentified virus(es). Reported from Conn., Ill., N.Y., Oreg., Wash., probably general. Fernleaf, sometimes considered a symptom of mosaic infection, has been reported from Ill., N.Y., and Wash.; also interpreted as a common genetic variation. One of the components of horseradish mosaic in Ill., Oreg., and Wis. has been shown to be turnip mosaic virus (*Marmor brassicae* Holmes, Brassica virus 2 K.M.Sm).

Black root—cause doubtful, in part bacterial (see *Erwinia* and *Xanthomonas*); in part virus (see Curly top and Mosaic).

Black streak (of stems)—cause unknown but sometimes associated with and perhaps an effect of mosaic. Ill., Wash.

Brittle root—See Curly top.

Fasciation—in part physiological, perhaps in part due to bacterial infection. N.J.

Hollow root — probably physiological. Common in overgrown roots.

Barbarea

B. vulgaris R. Br., wintercress, yellow-rocket. Biennial herb naturalized from Europe, sometimes a weed but useful to wildlife.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Calif., Tex.

Alternaria sp., leaf spot. Pa.

Cercospora barbarea (Sacc.) Chupp, leaf spot. Wis. *C. cruciferarum* Ell. & Ev., as reported on this host in Conn., N.J., and Pa., probably belong here.

Cuscuta gronovii Willd., dodder. N.Y.

Peronospora parasitica Pers. ex Fr., downy mildew. Tex. See note under *Arabis*.

Ramularia barbareae Pk., leaf spot. Mass. to N.J., Ohio, and Wis.; Tex.

Sclerotium rolfsii Sacc., stem rot. Tex.

Xanthomonas barbareae Burkh., black rot. N.Y.

Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.) Tex.

Yellow dwarf—virus (*Aureogenus vastans* (Holmes) Black, Solanum virus 16 K.M.Sm.). N.Y.

Brassica

Listed in 6 sections under the following species groups: I. Cabbage, cauliflower, kale, etc.—*B. oleracea;* II. Rape, rutabaga, etc.—*B. campestris, B. napus;* III. Turnip—*B. rapa;* IV. Black mustards—*B. juncea, B. nigra;* V. White mustards—*B. hirta, B. kaber;* VI. Chinese cabbage—*B. pekinensis, B. chinensis.*

I. Cabbage, Cauliflower, Kale

(1) *Brassica oleracea* L., var. *botrytis* L., cauliflower, broccoli.
(2) *B. oleracea* var. *capitata* L., cabbage.
(3) *B. oleracea* var. *gemmifera* DC., Brussels sprouts.
(4) *B. oleracea* var. *gongylodes* L., kohlrabi.
(5) *B. oleracea* var. *viridis* L., kale.

Cultivated throughout the United States in home gardens; commercial cultivation chiefly as follows: (1) California, New York, Colorado, Michigan; (2) Texas, New York, Wisconsin, California, and Southeastern, Middle Atlantic, and North Central States; (3) California, Texas; (5) Virginia to Florida and Texas. The seed crop is grown chiefly in the Pacific Northwest.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Calif. (1); Calif., Idaho, Ky., N.C., Nebr., Ohio, Tex. (2); Tex. (5).

Alternaria brassicae (Berk.) Sacc. (*A. herculea* (Ell. & Martin) J.A.Elliott), gray leaf spot. Calif., Conn., N.Y., Oreg., Tex. (1,2). Owing to nomenclatorial confusion many of the reports under this name have actually referred to *A. oleracea*. As the distribution indicated above pertains only to the fungus that is properly so designated under rules of nomenclature it is probably very incomplete.

A. oleracea Milbrath (*?A. circinans* (Berk. & Curt.) Bolle, *A. brassicicola* (Schw.) Wiltsh.), black spot of leaves and pods; brown rot, head browning (of cauliflower). General (1,2,5); Calif., Ind., N.Y., Tex. (3). See note under *Armoracia*.

A. tenuis Nees ex Cda., seed mold, secondary leaf spot. Cosmopolitan (1,2).

Ascochyta sp. (*?A. brassicae* Fckl.), leaf spot. Guam (2).

Botrytis cinerea Pers. ex Fr., gray-mold blight. Calif. (1,3); Fla. (1); frequent in Pacific Coast States, especially on seed crops (2); also gray-mold rot in transit, markets, and storage—cosmopolitan.

Cercospora brassicicola P. Henn., leaf spot. P.R. (1); Calif., Del., Fla., Ill., Miss., N.J., Okla., Tex., Guam, P.R. (2). Previously reported as *C. bloxami* Berk. & Br. but this has been held to be a synonym of *Alternaria brassicae*. *C. cruciferarum* Ell. & Ev., as reported in Ala. on (2) and (5), probably belongs here.

Cercosporella brassicae (Fautr. & Roum.) Hoehn. (*C. albomaculans* (Ell. & Ev.) Sacc.), white spot. Ind., Pa. (1); Oreg. (1,2). If *Cercosporella* is not maintained this becomes *Cercospora brassicae* (Fautr. & Roum.) Chupp.

Curvularia geniculata (Tracy & Earle) Boed., seed mold. In commercial samples.

Erwinia carotovora (L.R.Jones) Holland, slimy soft rot (in transit and markets), stump rot (in fields following black rot). Cosmopolitan (*).

Erysiphe polygoni DC., powdery mildew. Calif. (1); Ariz., Calif., Conn., Fla., Md., Nebr., Oreg., Tex. (2); Calif., Conn., Md., Va., ?Wash. (5).

Fusarium oxysporum Schlecht. f. *conglutinans* (Wr.) Snyd. & Hans., yellows. Calif., Del., Ind., La., Mich., N.J., N. Mex., N.Y., Tex., Wis. (1); general in susceptible varieties (2); Calif., Wis. (3); Ind., Wis. (4); Ala., Calif., Ill., Ind., Md., Miss., N.C., N.Y., S.C., Tex., Va. (5).

Helminthosporium brassicola (*brassicicola*) Schw., on leaves. ?Pa. See *Alternaria oleracea*.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Heterosporium variabile Cke., leaf mold. Mont., N.Y. (2).

Leptosphaeria olericola (Berk. & Curt.) Sacc., on stems. ?Mass.

Meloidogyne sp., root knot nematodes. Fla., N.J., Tex. (1); N.J. to Fla., Tex., and Calif., also T.H. (2); Ohio, Tex. (4); Ala., N.C., N.Y., S.C., Tex. (5).

Mycosphaerella brassicicola (Fr. ex Duby) Lindau, ring spot. Calif., Oreg., Wash. (1,2); N.Y. (1); Ill., Tex. (2); Calif. (3); Ala., Calif., Wash. (5).

Olpidium brassicae (Wor.) Dang., in roots. Minn., Miss., N.Y., Wis. (2).

Peronospora parasitica Pers. ex Fr., downy mildew. General on all types; typically a specialized race or races restricted to this species, sometimes specifically distinguished as *P. brassicae* Gäum. The authority is d By. if the name is based on the perfect stage.

Phoma lingam (Tode ex Fr.) Desm., blackleg, leaf spot. General east of Rocky Mountains, also Oreg., Wash. (2); Northeastern and Gulf States (1,3,5). Root rot—Calif. (3).

Phyllosticta brassicicola McAlp., leaf spot. Calif. (2). ? Spermatial stage of *Mycosphaerella brassicicola*.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,4,5).

Phytophthora megasperma Drechs., root rot. Calif. (1,2,3).

Plasmodiophora brassicae Wor., clubroot. General (*).

Pratylenchus pratensis (De Man) Filip., root nematode. Md. (2).

Pseudomonas maculicola (McCul.) F.L.Stevens, bacterial leaf spot, pepper spot. Widespread, mostly in the Northeastern and Middle Atlantic States, sometimes in the Gulf States; also Calif., Colo., Minn., Wash. (1,2); N.Y. (3); Va. (5).

Pythium sp., usually reported as *P. debaryanum* Hesse, damping-off. Occasional (*).

P. ultimum Trow, head rot, ? stump rot. Occasional in markets (2).

Rhizoctonia solani Kuehn, damping-off, bottom rot, wire-stem on seedlings and young plants. General (*); may also cause head rot of mature plants, especially (2). Occasionally reported in basidial stage, *Pellicularia filamentosa* (Pat.) Rogers (*Corticium solani* (Prill. & Del.) Bourd. & Galz.), on various *Brassica* spp.

Rhizopus stolonifer (Ehr. ex Fr.) Lind (*R. nigricans* Ehr.) black-mold rot. Occasional in markets, chiefly (2).

Sclerotinia sclerotiorum (Lib.) d By., drop, cottony rot of field plants; watery soft rot of heads. General (1,2); Calif., La., Tex. (3); Ind. (4); Ga., N.C., Oreg., S.C., Va., Wash. (5).

S. minor Jagger—Pa.

Sclerotium rolfsii Sacc., southern blight. N.C. to Fla. and Tex., occasional on all types, chiefly (2) and (5).

Stemphylium botryosum Wallr. (=*Pleospora herbarum* (Pers. ex Fr.) Rabh.), seed mold. In commercial samples (1,2). *S. consortiale* (Thuem.) Groves & Skolko also reported.

Xanthomonas campestris (Pam.) Dows., black rot. General (1,2,5); Fla., N.Y., Tex., Va. (3); Fla., Minn. (4).

Black ring—virus (*?Marmor brassicae* Holmes, Brassica virus 2 (probably = Brassica virus 1) K.M. Sm.). Calif. (1,2,3,5), Wash. (2). Flyspeck, reported on (2) in Wash., and ring necrosis in Wis. are probably caused by related virus strains.

Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (2).

Mosaic—virus (in part *Marmor brassicae*, in part *M. cruciferarum* Holmes, Brassica virus 3 K.M.Sm., separately or together). Cauliflower mosaic as reported in Calif. and Ariz. is typically caused by *M. cruciferarum* alone; perhaps also in N.J., N.Y., Oreg., S.C., and Va., or may be due to dual infection with this and *M. brassicae*. Cabbage mosaic as reported in Ill., Wash., and Wis., perhaps also in Calif., N.Y., Oreg., Pa., Utah and the Southeastern States is typically caused by dual infection with both viruses, though either alone but especially *M. cruciferarum* may cause mottling. Brussels sprouts, kale, and kohlrabi also are susceptible to both viruses, singly or together; mosaic (*?M. cruciferarum*) of (3) is reported in Calif., N.Y., and Oreg.

Ring necrosis—virus (*Marmor brassicae* Holmes, Brassica virus 2 (and ? 1) K.M.Sm.). Calif., Wash., Wis. (1,2). See also Black ring.

Spotted wilt—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (1).

Yellows—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (1,2), ? Tex. (2).

Black leaf speck (internal black spot)—physiological, attributed to low temperature and suboxidation in transit and storage. Calif., Idaho, Ind., Mich., Minn., N.Y., Wash., Wis. (1,2). Internal necrosis of mature heads may be caused also by the cabbage black ring virus.

Brown heart (internal browning, ? hollow stem)—physiological, probably boron deficiency. Fla., Mich., N.J., N.Y., Va. (1); Calif., N.Y., Tex., Va., Wis. (2). Internal necrosis of stems and roots, probably due to the same cause, is also reported on (2) in Wis.

Chlorosis—mineral deficiency: Of magnesium—N.Y. (1); Ala., Fla., Miss., N.C., N.Y., Va. (2); of manganese—Fla. (2).

Oedema, intumescence—in part physiological, due to excessive water tension or to copper-spray or other

chemical injury; in part mechanical, due to wind-blown sand or perhaps insect injury at times. Widespread (2), occasional (1,3,5).

PINK HEAD—cause unknown, presumed genetic. Calif. (1).

TIPBURN—physiological, probably potassium deficiency. Fla., N.C., N.J., N.Y., Va., Wis. (1,2).

WHIPTAIL (spindly growth and failure to head)—physiological, attributed to soil acidity and mineral deficiencies. N.J., N.Y. (1,2); W. Va. (1).

II. Rape and Rutabaga

(1) *Brassica campestris* L., bird rape.

(2) *B. campestris* var. *napobrassica* (L.) DC. (*B. napobrassica* (L.) Mill.), rutabaga. Biennial cultigen grown as a winter vegetable.

(3) *B. napus* L., rape. Biennial, grown as an annual crop for forage.

Annual or biennial herb of Europe, locally naturalized and an abundant weed in the Pacific Coast States; useful to wildlife.

Actinomyces: SEE *Streptomyces.*

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. N.Y., Tex. (2).

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Mass., Tex., Vt., T.H. (2); Minn. (3).

Alternaria brassicae (Berk.) Sacc. (*A. herculea* (Ell. & Martin) J.A. Elliott; sometimes written (Berk.) Sacc. sensu Bolle), gray leaf spot. Oreg. (1); Mich., Minn., Pa. (2); root rot, Minn. (2).

A. oleracea Milbrath (*?A. circinans* (Berk. & Curt.) Bolle, *A. brassicicola* (Schw.) Wiltsh.), black leaf spot. Conn., Mass., Minn., N.J., Pa., Tex., Va. (2).

Botrytis cinerea Pers. ex Fr., gray-mold rot. Occasional in markets (2).

Cercospora brassicicola P.Henn., leaf spot. Miss., N.J., Va., P.R. (2); P.R. (3). Usually reported as *C. bloxami* Berk. & Br., but see note in preceding section.

Cercosporella brassicae (Fautr. & Roum.) Hoehn. (=*Cercospora brassicae* (Fautr. & Roum.) Chupp), white spot. Oreg. (1); Calif., La., Mass., Minn. (2).

Colletotrichum higginsianum Sacc., anthracnose. Ga. (2).

Erwinia carotovora (L.R.Jones) Holland, slimy soft rot. Ga., N.C. (in fields); occasional in markets (2).

Erysiphe polygoni DC., powdery mildew. Northeastern States to Fla., Tex., and Calif.; also Wash., T.H. (2).

Fusarium sp., dry rot of roots. Minn. (2).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Ala., Ariz., Oreg., Tex. (2); Ala., Fla. (3).

Mycosphaerella brassicicola (Fr. ex Duby) Lindau, ring spot. Calif. (2).

Peronospora parasitica Pers. ex Fr., downy mildew. Conn., Fla., Iowa, N.J., Oreg., Tex. (2); Conn. (3). Also reported as *P. brassicae* Gäum. See note in preceding section.

Phoma lingam (Tode ex Fr.) Desm., blackleg, root rot. Conn., Ga., Mass., Minn., T.H. (2). Leaf spot and stem rot—Wash. (2).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex (2).

Plasmodiophora brassicae Wor., clubroot. Conn., N. Dak., Minn., N.J., N.Y., Wash. (2,3).

Pratylenchus pratensis (De Man) Filip., root nematode. Md. (2).

Pseudomonas maculicola (McCul.) F.L.Stevens, bacterial leaf spot. Mass., N.J., ?Minn. (2).

Rhizoctonia solani Kuehn, root and stem rot. Fla., Wash., T.H. (2).

Rhizopus stolonifer (Ehr. ex Fr.) Lind, soft rot. Cosmopolitan (2).

R. fusiformis Dawson & Povah—Ill. (2).

Sclerotinia sclerotiorum (Lib.) d By., watery soft rot, white blight. Calif. (1); Maine, Wash. (2); Calif., Idaho, Miss. (3).

Streptomyces scabies (Thaxt.) Waks. & Henrici, scab. Conn., Mich., N.J. (2).

Verticillium albo-atrum Reinke & Berth., wilt. Calif. (2).

Xanthomonas campestris (Pam.) Dows., black rot. Northeastern States to Fla. and Tex.; North Central States (2,3).

MOSAIC—virus (in part *Marmor brassicae* Holmes, Brassica virus 2 K.M.Sm.; perhaps also *M. cruciferarum* Holmes, Brassica virus 3 K.M.Sm.). Conn., Fla., Ind., Miss., N.Y., ? Idaho. (2); N.Y. (3). Systematic infection of these hosts results from inoculation with either virus; apparently the latter virus is reported on (1) in Oreg.

YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (1).

BROWN HEART (internal black spot, water core)—boron deficiency. Calif., Mass., Minn., Va., Wis. (2).

III. Turnip

Brassica rapa L.

Biennial of Eurasia, widely grown as a root vegetable and for greens.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Kans.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. General.

Alternaria brassicae (Berk.) Sacc., gray leaf spot, root rot. General in the North (N.Y. to Ind. and Iowa), Calif., Utah, Wash.; occasional in the South (Ala., Ark., Fla., Ga., Tex.).

A. oleracea Milbrath, black leaf spot. Conn., Fla., Md., Mass., N.C., N.J., Tex., T.H. See note under *Armoracia.*

A. tenuis Nees ex Cda., seed mold, secondary leaf spot. Cosmopolitan.

Cercospora brassicicola P. Henn., leaf spot. Ala., Fla., Ga., Miss. Formerly reported as *C. bloxami* Berk. & Br. *C. cruciferarum* Ell. & Ev., as reported in Kans., probably belongs here.

Cercosporella brassicae (Fautr. & Roum.) Hoehn. (=*Cercospora brassicae* (Fautr. & Roum.) Chupp), white spot. Mass. to Fla., Tex., and Ind.; Oreg.

Colletotrichum higginsianum Sacc., anthracnose, ? root rot. N.Y. to Fla., and Tex.; P.R.

Curvularia inaequalis (Shear) Boed., seed mold. In commercial samples.

Erwinia carotovora (L.R.Jones) Holland, slimy soft rot (in field, transit, and storage). General.

Erysiphe polygoni DC., powdery mildew. Northeastern States to Fla., Tex., and Iowa; also Pacific Coast States and Ariz., Nev., Utah.

Fusarium oxysporum Schlecht. f. *conglutinans* (Wr.) Snyd. & Hans., yellows. Ind., Miss., Tex.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. N.C. to Fla., Tex., and Okla.

Mycosphaerella brassicicola (Fr. ex Duby) Lindau, ring spot. Oreg.

Peronospora parasitica Pers. ex Fr. (*P. brassicae* Gäum.), downy mildew. Mass. to Fla., Tex., and Ill. See note in section I.

Phoma lingam (Tode ex Fr.) Desm. (*P. napobrassicae* Rostr.), blackleg—Conn., Mass. Leaf spot.—Wash.
Phyllosticta sp. (*?Phoma lingam*), leaf spot. Tex., W. Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Plasmodiophora brassicae Wor., clubroot. Maine to N.C., Tex., and Minn.; Calif., Colo., Wash.
Pseudomonas maculicola (McCul.) F.L.Stevens, bacterial spot. Conn., Ga., Mass., N.C., Va.
Pythium sp., root rot. N.Y.
P. ultimum Trow, damping-off. Wis.
Ramularia sp. (*?R. armoraciae* Fckl.), leaf spot. Fla., Wash., ?Ala.
Rhizoctonia solani Kuehn (=*Pellicularia filamentosa* (Pat.) Rogers), damping-off, root and stem rot, storage rot. Reported in Northeastern States, Fla., Tex., Va., Wash.; also P.R. and T.H.; probably general. *R. microsclerotia* Matz, web blight, reported in La., is probably a synonym.
Sclerotinia sclerotiorum (Lib.) d By., drop, watery soft rot. Conn., Md., Miss., Tex., Wash.
Sclerotium rolfsii Sacc., southern blight. Fla., Tex.
Septomyxa affine (Sherb.) Wr., leaf spot. Ala.
Stemphylium botryosum Wallr., seed mold. In commercial seed samples.
Streptomyces scabies (Thaxt.) Waks. & Henrici, scab. Conn., Mich., N.J., Wash.
Xanthomonas campestris (Pam.) Dows., black rot. Maine to Fla., Tex., and Minn.
X. vesicatoria (Doidge) Dows. var. *raphani* (H.E. White) Starr & Burkh., bacterial spot. Ind.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif.
MOSAIC—virus (probably *Marmor brassicae* Holmes, Brassica virus 2 K.M.Sm.). Ala., Calif., Conn., Fla., Ind., Kans., La., Md., Miss., N.J., N.Y., S.C., Tex., Wis. Natural mosaic infections commonly involve strains of this virus alone; the cauliflower mosaic virus (*M. cruciferarum* Holmes) can infect turnips systemically, but has not been identified in this host in nature. A leaf-distorting suspected virosis, reported in Idaho, is perhaps related.
BROWN HEART (dark center)—physiological, probably boron deficiency. Conn., Maine, Mass.

IV. Black Mustards

(1) *Brassica juncea* (L.) Coss, including var. *crispifolia* Bailey (*B. japonica* Hort.), leaf mustard.
(2) *B. nigra* (L.) Koch, black mustard.

Annual herbs of Europe or Asia: (1) cultivated for greens; (2) naturalized throughout the United States, an abundant weed in some places but grown for seed in California and the source of commercial mustard.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. General (1,2).
Alternaria brassicae (Berk.) Sacc., leaf spot. Iowa (2).
A. oleracea Milbrath, black leaf spot. Calif., Iowa (2).
Cercospora brassicicola P.Henn., leaf spot. Ind., La., N.J., P.R. (1); N.J. (2).
Cercosporella brassicae (Fautr. & Roum.) Hoehn. (*C. albomaculans* (Ell. & Ev.) Sacc.), white spot. Calif., Va. (1); Mass. (2). See note in section I.
Colletotrichum higginsianum Sacc., anthracnose. N.C. (2).
Erwinia carotovora (L.R.Jones) Holland, slimy soft rot. Okla., P.R. (1).
Erysiphe polygoni DC., powdery mildew. Ariz., Calif., Fla., Tex. (1); Calif., Ind., Iowa (2).
Fusarium sp., wilt. N. Dak. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
H. schachtii A. Schm., root gall. Utah (1,2).
Meloidogyne sp., root knot nematodes. Fla., Mo., Tex. (1,2).
Peronospora parasitica Pers. ex Fr., downy mildew. Conn., Fla., Iowa, Tex. (1); Fla., Iowa, N.Y., S. Dak., Wis. (2).
Phoma lingam (Tode ex Fr.) Desm., root rot. Calif. (2).
Plasmodiophora brassicae Wor., clubroot. Calif. (1,2); Conn., Ohio, Tex., Wash. (1).
Puccinia aristidae Tracy (O,I), rust. Colo. (1,2). II and III on *Aristida* and *Distichlis*.
Ramularia armoraciae Fckl., leaf spot. Mich. (2).
Rhizoctonia solani Kuehn, damping-off. General.
Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. Calif., Tex. (1,2).
Septoria brassicae Ell. & Ev., leaf spot. W. Va. (2).
Xanthomonas campestris (Pam.) Dows., black rot. Fla., Ohio (1).
X. vesicatoria (Doidge) Dows., bacterial spot. Okla. (2).

MOSAIC—virus(es). Ind., La., N.Y., Va., Tex., Wis. (1); Calif., Idaho, Ind., La., N.Y. (2). Both are susceptible to systemic infection by *Marmor brassicae* Holmes and *M. cruciferarum* Holmes (Brassica viruses 2 and 3 K.M.Sm.).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Tex. (1).

V. White Mustards

(1) *Brassica hirta* Moench (*B. alba* (L.) Rabh.), white mustard.
(2) *B. kaber* (DC.) L.C.Wheeler (*B. arvensis* (L.) Rabh.), charlock.

Annual herbs of Europe, naturalized locally (1) or widely (2) in the United States; minor weeds.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. N.C. to Tex. and S. Dak. (1); general (2).
Alternaria sp., leaf spot. Vt. (1).
Cercospora brassicicola P. Henn., leaf spot. Tex., P.R. (2).
Erysiphe polygoni DC., powdery mildew. Tex. (1); Calif., N.J. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
H. schachtii A. Schm., root gall. Utah (1).
Meloidogyne sp., root knot nematodes. Tex. (1).
Peronospora parasitica Pers. ex Fr., downy mildew. S. Dak., Tex. (1); Iowa (2). See note in section I.
Plasmodiophora brassicae Wor., clubroot. Calif. (1), N.J. (2).
Puccinia aristidae Tracy (O,I), rust. Colo. (2).
Rhizoctonia solani Kuehn, damping-off. Minn., Tex. (2).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Tex. (1), Mont. (2).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett (*Chlorogenus eutetticola* Holmes), Beta virus 1 K.M.Sm.). Calif.

VI. Chinese Cabbage

(1) *Brassica pekinensis* (Lour.) Rupr., petsai.
(2) *B. chinensis* L., pak-choi.

Annual to biennial herbs of China: (1) grown widely as a cool-season vegetable, (2) chiefly as a garden novelty for greens; both

indiscriminately called Chinese cabbage, but in market terms this refers to (1).

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Ala.

Alternaria brassicae (Berk.) Sacc., gray leaf spot. Calif., Conn., Fla., Ind., Md. (1).

A. oleracea Milbrath, black leaf spot. Calif., Conn., Fla., Mass., N.H., Tex. (1). See note under *Armoracia.*

Cercospora brassicicola P. Henn., leaf spot. Fla., Ga., N.H., N.J., P.R. (1). Reports of *C. armoraciae* Sacc. and *C. cruciferarum* Ell. & Ev., from N.H. and Fla., probably belong here.

Cercosporella brassicae (Fautr. & Roum.) Hoehn., white spot. Ala., Calif., Conn., Fla., Ind., Md., Mass., Mo., Pa., Va. (1); Calif. (2).

Colletotrichum higginsianum Sacc., anthracnose. Fla. (1).

Erwina carotovora (L. R. Jones) Holland, slimy soft rot. Conn., Mass., Mo., Va., P.R., and occasionally in markets.

Erysiphe polygoni DC., powdery mildew. Ariz., Mass. (1).

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Ariz., Fla. (1).

Peronospora parasitica Pers. ex Fr., powdery mildew. (1). See note in section I.

Phoma lingam (Tode ex Fr.) Desm., leaf and stalk rot. Wash. (1).

Plasmodiophora brassicae Wor., clubroot. Conn., Mass., N.J., Ohio, Pa. (1).

Pseudomonas maculicola (McCul.) F. L. Stevens, bacterial leaf spot. Va.

Sclerotina sclerotiorum (Lib.) d By., watery soft rot. Ariz, Mass., N.Y., Tex. (1).

Sclerotium rolfsii Sacc., southern blight. Tex. (1).

Xanthomonas campestris (Pam.) Dows., black rot. Ind., Md., Tex. (1).

Mosaic—virus (probably strains of *Marmor brassicae* Holmes and *M. cruciferarum* Holmes, Brassica viruses 2 and 3 K.M.Sm., singly or together). Calif., Fla., Ind., N.Y., Oreg., T.H. (1). A suspected virosis called flyspeck is reported in Oreg.

Virus yellows — probably *Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm. N.Y. (1).

Camelina, falseflax

(1) *C. microcarpa* Andrz.
(2) *C. sativa* (L.) Crantz

Annual herbs naturalized from Europe, weeds in flax fields; seed yields oil and furnishes food for wildlife.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Ohio, Okla., Utah, Va. (1,2); Pa. (1); Mont., Nebr., Tex. (2).

Plasmodiophora brassicae Wor., clubroot. N.J. (1,2).

Puccinia aristidae Tracy (O,I), rust. Colo., Utah (1).

Capsella

C. bursa-pastoris (L.) Medik., shepherds-purse.

Annual herb naturalized from Europe; cosmopolitan weed; useful to wildlife.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. General.

Cylindrosporium capsellae Ell. & Ev., leaf spot. Ind., Iowa, Mo., Tex., Wis.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Ala.

Peronospora lepidii (McAlp.) G. W. Wils., downy mildew. Ky., Wash.

P. parasitica Pers. ex Fr., downy mildew. General, reported from N.H. to Ill., Tex., and Wash. The form on this host has been distinguished as var. *capsellae* C. T. Wang. See note under *Armoracia.*

Plasmodiophora brassicae Wor., clubroot. Calif., N.J., N.Y., Wash.

Pseudomonas tabaci (Wolf & Foster) F. L. Stevens, bacterial leaf spot. Wis.

Puccinia aristidae Tracy (O, I), rust. Colo., Del., Nebr., Nev., Utah.

Ramularia armoraciae Fckl., leaf spot. Alaska.

Rhizoctonia solani Kuehn, root rot. Wash.

Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif.

Mosaic—virus (*?Marmor brassicae* Holmes or *M. cruciferarum* Holmes). Idaho, Wis. Both Crucifer viruses and also beet mosaic virus cause a systemic mottle in this host.

Yellows—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif.

Cardamine, bittercress

Cardamine spp.

Low herbs, mostly boreal or alpine in moist, cool habitats; seldom cultivated but adapted to bog gardens; useful to wildlife.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Ind. (on *C. bulbosa* (Schreb.) B. S. P.); Wis. (on *C. douglassii* (Torr.) Brit.); Ga. (on *C. parviflora* L.); N.C. (on *C. pennsylvanica* Muhl.).

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Fla. (on *C. hirsuta*).

Peronospora parasitica Pers. ex Fr., downy mildew. Del., N.Y., Wis. (on *C. bulbosa*); Wis. (on *C. douglassii*); Ill., Md., W. Va. (on *C. hirsuta*); Nebr., Va., Wis. (on *C. parviflora*); N.C., Wis. (on *C. pennsylvanica*). See note under *Armoracia.*

Phoma lingam (Tode ex Fr.) Desm., on stems. Alaska (on *C. bellidifolia* L.).

Puccinia cruciferarum Rudolphi (III), rust. Calif., Alaska (on *C. bellidifolia*); Utah, Wyo. (on *C. cordifolia* A. Gray).

Septoria dentariae Pk., leaf spot. Del., N.Y., Wis. (on *C. bulbosa*); Wis. (on *C. douglassii*).

Cheiranthus

C. cheiri L., wallflower.

Spring-blooming perennial of Europe, grown for ornament chiefly in the North.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Minn.

Ascochyta cheiranthi Bres., on leaves. Alaska.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Wash., Alaska.

Heterosporium sp., leaf spot. Okla.

Mycosphaerella cruciferarum (Fr.) Lindau, on pods. Pa.

Rhizoctonia solani Kuehn, crown rot. N.J.

Mosaic—Natural infection not reported but reacts with systemic mottle to inoculation with turnip mosaic virus, *Marmor brassicae* Holmes.

Yellows—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif.

Cochlearia

C. officinalis L., scurvyweed.

Low perennial of northern Europe, sometimes grown in the Far North for greens or medicinal use.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Nebr., N.H.

Coronopus, wartcress

(1) *C. didymus* (L.) J.E.Smith
(2) *C. procumbens* Gilib.

Low weedy herbs, introduced from Europe; useful to wildlife.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ? Fla. (2).
Peronospora lepidii (McAlp.) G. W. Wils., downy mildew. N.C. (1).

Crambe

C. maritima L., seakale.

Coarse perennial of Europe, grown for edible shoots.

Alternaria oleracea Milbrath, black leaf spot. Va. See note under *Armoracia*.
Fusarium oxysporum Schlecht. f. *conglutinans* (Wr.) Snyd. & Hans., yellows. Ind.

Dentaria, toothwort

Dentaria spp.

Native perennial herbs of woodlands, sometimes grown in wild gardens.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. On various species from Maine to S.C., Ind., and Wis.; also Calif.
Peronospora parasitica Pers. ex Fr., downy mildew. Commonly on *D. laciniata* Muhl. and *D. diphylla* Michx., occasionally on other species, in the Northeastern and Central States. Also reported as *P. cardamines-laciniatae* Gäum. See note under *Armoracia*.
Phyllosticta sp., leaf spot. Oreg. (on *D. tenella* Pursh).
Puccinia dentariae (Alb. & Schw.) Fckl. (III), rust. Oreg. (on *D. tenella* Pursh).
Septoria dentariae Pk., leaf spot. Mich., N.Y. (on *D. diphylla*); Ill., Ind., Wis. (on *D. laciniata*).

Descurainia (*Sophia, Sisymbrium* in part), tansymustard

(1) *D. incisa* (Engelm.) Brit.
(2) *D. pinnata* (Walt.) Brit.
(3) Other species.

Native annual herbs of wide distribution, most frequent on open ground in the Western States; sometimes used for greens; useful to wildlife.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Colo., Kans., Mont., N. Mex., Wash., Wyo. (1); Ariz., Ind., Iowa, Kans., Mont., Nev., Okla. (2); Mont. (3).
Ascochyta sisymbrii Ell. & Kell., leaf spot. Kans. (2).
Cercospora nasturtii Pass., leaf spot. Tex. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla., Nev. (2).
Peronospora lepidii (McAlp.) G. W. Wils., downy mildew. N. Mex. (1).
P. parasitica Pers. ex Fr.—Colo., Kans., Minn., Mont., Nebr., N. Mex., Okla. (1); Ala., Iowa, Kans., Nebr., N. Mex., S. Dak., Tex., Wis. (2); Nev., Wis. (3). Also reported as *P. sophiae-pinnatae* Gäum.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Puccinia aristidae Tracy (O,I), rust. Colo., Nebr., N. Mex., Utah (1); Ariz., Colo., N. Mex. (2). II and III on *Aristida* and *Distichlis*.
P. holboellii (Hornem.) Rostr. (O,III)—Tex. (2).
P. monoica (Pk.) Arth. (O,I)—Colo., N. Mex., Utah (1); Colo., N. Mex. (2); Utah (3). II and III on *Koeleria* and *Trisetum*.
Septoria sisymbrii Ell., leaf spot. Okla. (1). *S. sisymbrii* Niessl has priority, may be distinct.
Urocystis coralloides Rostr., root gall. Ariz. (2).

Draba

Draba spp., whitlowgrass.

Small herbs, native and European, of diverse habit, useful chiefly in rock gardening; useful to wildlife.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Kans. (on *D. caroliniana* Walt.); Wyo. (on *D. nemorosa* L.).
Mycosphaerella pachyasca (Rostr.) Vest., on stems. Alaska.
Peronospora parasitica Pers. ex Fr. (*P. drabae* Gäum.), downy mildew. Ill., Iowa, Kans., Nebr., Wis. (on *D. caroliniana*); Colo., S. Dak., Wyo. (on *D. nemorosa*); Tex. (on *D. cuneifolia* Nutt. and *D. platycarpa* Torr. & Gray).
Phlyctaena andersonii Ell., on stems. Mont.
Pleospora media Niessl, on stems. Alaska.
Puccinia aristidae Tracy (O,I), rust. Ariz. (on various species).
P. drabae Rudolphi (III)—Alaska, Utah, Wyo. (on various species.).
P. holboellii (Hornem.) Rostr. (O,III)—Calif., Colo., Utah.
P. monoica (Pk.) Arth. (O,I)—Calif., N. Mex.

Erysimum

(1) *E. asperum* DC., western wallflower.
(2) Other species.

E. asperum, showy-flowered perennial of open ground ranging from the Northeastern and Central States south and west, includes the cultivated form known as *Cheiranthus allionii* Hort.; (2) native or introduced from Europe, occur on waste ground, some have ornamental value.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Oreg., Tex. (1); Idaho (2).
Cercospora erysimi J. J. Davis, leaf spot. Wis. (2).
Erysiphe polygoni DC., powdery mildew. Calif. (2).
Peronospora parasitica Pers. ex Fr., downy mildew. Idaho (1); Colo., Iowa, Wyo. (2).
Plasmodiophora brassicae Wor., clubroot. N.J. (1,2).
Pleospora vulgaris Niessl, on stems. Calif.
Puccinia aristidae Tracy (O,I), rust. Colo., N. Dak. (1); Ariz., Nebr., Utah (2).
P. consimilis Ell. & Ev. (I,III)—Mont. (on *E. parviflorum*).
P. holboellii (Hornem.) Rostr. (O,III)—Colo. (1).
Rhizoctonia solani Kuehn, root rot. Tex. (1).

MOSAIC—Natural infection not reported, but some strains of turnip mosaic virus (*Marmor brassicae* Holmes) induce systemic mottling. Susceptibility to aster yellows virus, *Chlorogenus callistephi* Holmes, also shown.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (1).

Hesperis

H. matronalis L., damesrocket.

Perennial or biennial herb of Europe, cultivated for ornament and naturalized in the Eastern and Central States.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. N.Y.
Peronospora parasitica Pers. ex Fr. (*? P. hesperidis* Gäum.), downy mildew. N.Y., Pa.
Plasmopara brassicae Wor., clubroot. N.J.
Mosaic—virus (? *Marmor brassicae* Holmes, Brassica virus 2 K.M.Sm.) Oreg. Strain of cucumber mosaic virus—Wash.

Iberis, candytuft

(1) *I. amara* L.
(2) *I. umbellata* L.

Annuals or perennial herbs of southern Europe, cultivated for ornament.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Calif. (1).
Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska (2).
Cuscuta indecora Choisy, dodder. Tex. (1,2).
Erysiphe polygoni DC., powdery mildew. Calif. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Ala. (2).
Peronospora parasitica Pers. ex Fr. (*P. iberidis* Gäum.) downy mildew. Calif. (1).
Phoma lingam (Tode ex Fr.) Desm., root rot. Calif. (2).
Plasmodiophora brassicae Wor., clubroot. Mass., N.J. (2).
Pythium oligandrum Drechs., root rot. Maine (1,2).
Rhizoctonia solani Kuehn, damping-off. Cosmopolitan.

Lepidium

(1) *L. sativum* L., peppergrass, garden cress

European annual grown in gardens for greens and sometimes escaped.

(2) *L. campestre* (L.) R.Br.

Biennial of Europe, widely naturalized in the United States, a troublesome weed in the West.

(3) *L. densiflorum* Schrad.
(4) *L. virginicum* L.

Widely distributed native annuals: (3) more frequent north and west, (4) south and east; useful to wildlife.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Nebr., Tex. (1); Ind., N.Y. (2); general (3,4).
Alternaria brassicae (Berk.) Sacc., leaf spot. N.Y. (2,4).
Cercospora sp., leaf spot. N.J. (2,4); P.R. (3). *C. lepidii* Pk. as reported on (2) and (4) in N.Y. has been shown to be *Alternaria brassicae* (Berk.) Sacc.
Cuscuta arvensis Beyrich, dodder. Okla. (4).
Cylindrosporium capsellae Ell. & Ev., leaf spot. Ind., Wis. (4).
Ditylenchus dipsaci (Kuehn) Filip., stem and leaf nematode. N.Y. (4).
Leptosphaeria virginica (Cke. & Ell.) Sacc., on stems. Ga., N.Y. (4).
Peronospora lepidii (McAlp.) G. W. Wils., downy mildew. Iowa, S. Dak., Tex. (1); Kans. (3); Fla., Ill., N.C., Va. (4). *P. lepidii-virginici* Gäum. (4); *P. lepidii-sativae* Gäum. (1).
P. parasitica Pers. ex Fr., downy mildew. Iowa, Kans., N. Dak., Tex., Wis. (3); general (4). See note under *Armoracia*.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (*).
Plasmodiophora brassicae Wor., clubroot. N.J. (2,4).
Pleospora lepidiicola Earle, on stems. Colo., Tex. (3).
Puccinia aristidae Tracy (O,I), rust. Tex. (1,4); Colo., Ky., Mont., Nebr., N. Dak., Tex., Utah (3); Ariz., Del., Ind., Kans., Nev., N. Mex. (species not designated). II and III on *Distichlis spicata* and other grasses.
P. holboellii (Hornem.) Rostr. (O,III)—Mont., Wyo.
P. monoica (Pk.) Arth. (O,I)—Wyo.
Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, pink root. N. Dak., S. Dak. (1,2).
Pythium debaryanum Hesse, damping-off. Tex. (1).
Rhizoctonia solani Kuehn, damping-off. Tex. (1). Reported also in the basidial stage as *Pellicularia filamentosa* (Pat.) Rogers.
Sclerotinia sclerotiorum (Lib.) dBy., crown rot. Mass. (1).
Septoria lepidiicola Ell. & Martin, leaf spot. Nebr., Tex., Wis. (3); Ill., Md., Miss., N.Y., Pa., Tex., Wis. (4).
Synchytrium lepidii M. T. Cook (*S. infestans* Rytz ?), leaf gall. La. (4).
Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (2).
Mosaic—virus. Not reported in nature but both *Marmor brassicae* Holmes and *M. cruciferarum* Holmes (Brassica viruses 2 and 3 K.M.Sm.) can induce systemic mottle in (1) and (4).

Lesquerella, bladderpod

Lesquerella spp.

Annual or perennial herbs of prairies and dry plains in the Middle and Far West, sometimes grown in wild gardens, some species of minor forage value.

Helminthosporium nanum Nees, leaf spot. Tex.
Phoma punctiformis Desm., stem blight. Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia aristidae Tracy (O,I), rust. Ariz.

Lobularia (*Koniga*)

L. maritima (L.) Desv., sweet alyssum.

Low perennial of southern Europe, cultivated for ornament, occasionally naturalized in the Northeastern and Pacific Coast States.

Cuscuta sp., dodder. Tex.
Erysiphe polygoni DC., powdery mildew. Calif.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.
Peronospora parasitica Pers. ex Fr., downy mildew. Calif., N.J. See note under *Armoracia*.
Phoma lingam (Tode ex Fr.) Desm., root rot. Calif.
Plasmodiophora brassicae Wor., clubroot. N.J.
Pythium ultimum Trow, damping-off. N.J.
Rhizoctonia solani Kuehn, damping-off, root rot. N.J., N.Y., Va.
Sclerotinia sclerotiorum (Lib.) d By., crown rot. Va.
Yellows—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.J.

Lunaria

L. annua L., honesty.

European annual or biennial, cultivated for

ornamental flowers and seed pods; occasionally escaped.

Alternaria oleracea Milbrath, black spot of leaves and pods. Mass. See note under *Armoracia*.
Helminthosporium lunariae Pollacci, leaf spot. Mass.
Leptothyrium lunariae G. Kunze, on stems. Mass.
Plasmodiophora brassicae Wor., clubroot. N.J.

Matthiola, stock

(1) *M. bicornis* (Sibth. & Sm.) DC., evening-scented stock.

Annual of southern Europe, grown for ornament.

(2) *M. incana* (L.) R.Br, including var. *annua* (L.) Voss, common stock.

Perennial (also an annual form) of southern Europe, extensively cultivated for ornament in the open and under glass, naturalized in California.

Alternaria raphani Groves & Skolko, leaf spot. Calif. (2).
Botrytis cinerea Pers. ex Fr., gray-mold blight. Tex., Alaska (2).
Colletotrichum gloeosporioides Penz., leaf and stem spot. Tex.
Fusarium avenaceum Sacc., root and stem rot. Del., N.J. (2).
F. oxysporum Schlecht. f. *mathioli* K. F. Baker, wilt. Ariz., Calif. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Tex. (2).
Myrothecium roridum Tode ex Fr., leaf spot. Tex. (2).
Peronospora parasitica Pers. ex Fr. (*P. matthiolae* Gäum.), downy mildew. Ill. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Phytophthora cryptogea Pethyb. & Laf., stem rot. Calif. (2).
P. megasperma Drechs., root rot. Calif. (1,2).
Plasmodiophora brassicae Wor., clubroot. N.J. (1).
Pythium spp., damping-off, root rot. *P. artotrogus* (Mont.) d By.—N.H.; *P. oedochilum* Drechs.—? Calif.; *P. vexans* d By.—Calif.; all on (2).
Rhizoctonia solani Kuehn, damping-off, root rot. Cosmopolitan (1,2).
Sclerotinia sclerotiorum (Lib.) d By., crown rot, wilt. Calif., Mich., Pa. (2).
Verticillium sp. (? *V. albo-atrum* Reinke & Berth.), wilt. N.Y.
Xanthomonas incanae (Kendr. & K. F. Baker) Starr et al., black rot. Calif., Tenn. (2).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (2).
MOSAIC—virus (*Marmor matthiolae* Holmes, Matthiola virus 1 K.M.Sm.). Calif. (2). Perhaps a strain of *Marmor brassicae* Holmes or *M. cruciferarum* Holmes (Brassica viruses 2 and 3 K.M.Sm.). Both viruses induce systemic mottling in this host but only the former causes flower-breaking.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Tex. (2).

Nasturtium

N. officinale R. Br. (*Rorippa nasturtium-aquaticum* (L.) Schinz & Thell.), watercress.

Aquatic perennial of Eurasia, naturalized in streams throughout the Eastern and Central States to California; cultivated for greens; useful to wildlife.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Minn.
Cercospora nasturtii Pass., leaf spot. Calif., Conn., Fla., Ind., N.H., Tex., Wis., T.H.
Puccinia aristidae Tracy (O,I), rust. Ariz., Colo., Tex.
Pythium debaryanum Hesse, root rot. Tex.
Rhizoctonia solani Kuehn, damping-off. Tex.

Radicula

See *Armoracia* and *Rorippa*.

Raphanus

(1) *R. sativus* L., garden radish.
(2) *R. raphanistrum* L., wild radish.

European biennial: (1) cultivated and sometimes escaped; (2) naturalized in the Northeastern and Pacific Coast States, sometimes a weed but useful to wildlife.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust (white blister). General (1); no reports on (2) in U.S. but doubtless present.
Alternaria brassicae (Berk.) Sacc. (*A. herculea* (Ell. & Martin) Elliott), gray leaf spot. Calif., Conn., Mich. (1).
A. oleracea Milbrath (? *A. circinans* (Berk. & Curt.) Bolle, *A. brassicicola* (Schw.) Wiltsh.), black leaf spot. Conn., N.J. (1).
A. raphani Groves & Skolko, black pod blotch, seedling blight. Calif., Mich., Minn., N.J., Ohio, Pa. (1). *A. tenuis* Nees ex Cda. also occurs commonly as a saprophyte on seed.
Aphanomyces raphani Kendr., black root (in part). Maine to Fla., Okla., and Iowa; Calif. (1). See also *Pythium aphanidermatum*.
Ascochyta sp., root rot. Mass. (1).
Cercospora atrogrisea Ell. & Ev., leaf spot. N.J. (1).
C. cruciferarum Ell. & Ev. Ala., Fla., Ill., Mo., Tex. (1).
Ditylenchus dipsaci (Kuehn) Filip., leaf and stem nematode. N.Y. (2).
Erwinia carotovora (L. R. Jones) Holland, soft rot. Cosmopolitan.
Erysiphe polygoni DC., powdery mildew. Calif., Mo., Tex. (1).
Fusarium oxysporum Schlecht. f. *raphani* Kendr. & Snyd., wilt. Calif. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Ala., Miss., Oreg., Pa., Tex. (1).
Peronospora parasitica Pers. ex Fr. (*P. brassicae* Gäum.), downy mildew. Northeastern and Central States to Miss. and Tex.; Calif. (1); N.J. (2). The form on radish has also been called var. *raphani* C. T. Wang. The authority is d By. if the name is based on the perfect stage.
Phoma lingam (Tode ex Fr.) Desm., pod rot. Fla. (1). Root rot—Calif. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Plasmodiophora brassicae Wor., clubroot. Occasional in the North (Mass. to N.J. and Minn.), also Wash., Alaska (1).
Puccinia aristidae Tracy (O,I), rust. Ariz., Colo. (1).
Pythium aphanidermatum (Edson) Fitz., black root (in part). Ind., Kans., Mass., Mich., Miss., N.Y., Ohio, Okla., Pa., S.C., Wis. SEE ALSO *Aphanomyces raphani*.
P. debaryanum Hesse (perhaps *P. ultimum* Trow in part), damping-off. Mass., Minn., N.J., Va. (1).
Rhizoctonia solani Kuehn, damping-off, root rot. Cosmopolitan.

Sclerotinia sclerotiorum (Lib.) d By., crown rot, watery soft rot. Calif. (1,2); Ind., Minn., N.J., Tex. (1).
Stemphylium botryosum Wallr., on seed. Cosmopolitan.
Streptomyces scabies (Thaxt.) Waks. & Henrici, scab. Ind., Mich., N.J., Ohio, Tex., Wis. (1).
Xanthomonas campestris (Pam.) Dows., black rot. Ind., Iowa, Mich., N.J., N.Y., Ohio, Pa., Tex. (1).
X. vesicatoria (Doidge) Dows. var. *raphani* (H. E. White) Starr. & Burkh., bacterial spot. Ind. (1).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1).
MOSAIC—unidentified virus. Calif., Ind., T.H. Both *Marmor brassicae* Holmes and *M. cruciferarum* Holmes (Brassica viruses 2 and 3 K.M.Sm.) can induce systemic mottling in this host.
YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (1).

Rorippa

(1) *R. islandica* (Murray) Borbas Bess., including var. *hispida* (Desv.) Butters & Abbe, marshcress.
(2) *R. sylvestris* (L.) Bess., yellow fieldcress.

Annual or biennial herb of bogs (1), naturalized from Europe or native throughout the United States. Perennial of wet meadows (2), naturalized from Europe in the Eastern States. Both species useful to wildlife.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Ill., N. Dak., S. Dak., Oreg., Wis. (1).
Cercospora nasturtii Pass., leaf spot. Wis. (1,2).
Heterodera marioni (Cornu) Goodey. SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla. (1).
Peronospora lepidii (McAlp.) G. W. Wils., downy mildew. Iowa (1).
P. parasitica Pers. ex Fr.—Iowa, Mich., Wis. (1).
Plasmodiophora brassicae Wor., clubroot. N.J. (1,2).
Puccinia aristidae Tracy (O,I), rust. Colo. (1).
Septoria radiculae Dearn., leaf spot. N.Y. (1).
YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif.

Sisymbrium

(1) *S. altissimum* L., hedgemustard.
(2) *S. officinale* (L.) Scop., tall hedgemustard.
(3) *S. irio* (L.) Britt.

Coarse annuals or biennials of Europe: (1) and (2) established as weeds throughout the United States, especially in the Middle and Far West; (1) is useful to wildlife, (3) is a potential green-manure crop.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. General (1,2); N. Mex., Tex. (3).
Cercospora sp., leaf spot. Del. (2). Reported as *C. cruciferarum* Ell. & Ev. and *C. nasturtii* Pass.
Peronospora parasitica Pers. ex Fr. (*P. sisymbrii-officinalis* Gäum.), downy mildew. Wis. (1); Iowa (2); Kans., Md. (species not designated).
Plasmodiophora brassicae Wor., clubroot. N.J. (1,2); Wash. (2).
Puccinia aristidae Tracy (O,I), rust. Colo. (1).
Septoria sisymbrii Ell., leaf spot. Idaho, Ky., Mich., N.J., W. Va. (2).
?Typhula sp. (*Sclerotium fulvum* Fr.), on stems. Mont. (1).
STREAK—virus (*Annulus orae* Holmes, Nicotiana virus 8 K.M.Sm.). Wis. (2).

Smelowskia

Smelowskia spp.

Low perennial herbs of alpine areas in the Western States, sometimes grown in rock gardens.

Puccinia aberrans Pk. (O,III), rust. Colo., Mont., Nev., Utah, Wash.
P. holboellii (Hornem.) Rostr. (O,III)—Nev.
P. monoica (Pk.) Arth. (O,I)—Colo., Wyo.

Stanleya

S. pinnata (Pursh) Britt., desertplume.

Coarse showy-flowered perennial of arid plains, sometimes grown for ornament.

Cercospora nasturtii Pass., leaf spot. Kans.
Puccinia aristidae Tracy (O,I), rust. Colo., Nev.

Thlaspi

(1) *T. arvense* L., pennycress, frenchweed.
(2) Other species.

Annual herb naturalized from Europe, a troublesome weed in the northern United States but useful to wildlife. Native and introduced species are sometimes grown in gardens for the ornamental pods.

Albugo candida (Pers. ex Chev.) Kuntze, white-rust. Colo., Mont., Wyo. (1,2).
Plasmodiophora brassicae Wor., clubroot. N.J. (1).
Puccinia aristidae Tracy (O,I), rust. Colo., Tex. (1).
P. oudemansii Tranz. (III)—Utah (2).
P. thlaspeos Schub. (III)—Colo., Idaho, Utah, Wyo. (2).
Ramularia armoraciae Fckl., leaf spot. Tex.
Sclerotinia sclerotiorum (Lib.) dBy., crown rot. Mont. (1).

CUCURBITACEAE

Benincasa

B. hispida Cogn., Chinese waxgourd.

Annual vine of tropical Asia, sometimes grown for culinary use.

Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. Ind.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla.
Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Mass.

Bryonopsis

B. laciniosa Naud.

Annual vine of tropical Asia, grown for ornamental fruit.

Pseudomonas lachrymans (E.F.Sm. & Bryan) Carsner, bacterial spot. Wis.

Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Mass., Ohio.

Citrullus

C. vulgaris Schrad, watermelon, including var. *citroides*, citron.

Annual vine of tropical and South Africa, cultivated for edible fruit, fresh or preserved, throughout the United States except the extreme north; commercial production chiefly in the Southeastern and Gulf States to Maryland and Iowa, also in California.

Alternaria cucumerina (Ell. & Ev.) J.A.Elliott, leaf spot. General except the Pacific Coast States. *A. brassicae* (Berk.) Sacc. var. *nigrescens* Pegl. (*A. nigrescens* (Pegl.) Neerg.) may be a synonym.

Ascochyta citrullina C.O.Sm.: SEE *Mycosphaerella citrullina.*

Cercospora citrullina Cke., leaf spot. N.J. to Fla., Tex., and Ohio; also P.R., Guam.

Cladosporium cucumerinum Ell. & Arth., leaf mold, scab. Md., Nebr., P.R.

Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. General except the Pacific Coast States. The suggested change of the specific name to *lagenariae*, based on *Fusisporium lagenariae* Schw., does not appear to be warranted by examination of the Schweinitz specimen.

Cribopeltis citrullina Tehon, fruit speck. Ill.

Diplodia spp., stem-end rot, gray rot. Md. to Fla., Ariz., and Kans. Usually referred to *D. tubericola* (Ell. & Ev.) Taub., *D. natalensis* P.Evans, or *D. theobromae* (Pat.) Nowell, conidial stage of *Physalospora rhodina* or perhaps *P. abdita.*

Diplodina citrullina (C.O.Sm.) Gross.: SEE *Mycosphaerella citrullina.*

Erwinia aroideae (Town.) Holland, soft rot. W. Va.

E. tracheiphila (E.F.Sm.) Holland, bacterial wilt. Reported occasionally in various localities but occurrence on this host is exceptional; in inoculation experiments usually resistant.

Erysiphe cichoracearum DC., powdery mildew. Ariz., Calif., Fla., Ga., N.C., N.Y., Tex., Va. See note under *Cucumis sativus.*

Fusarium oxysporum (Schlecht.) f. *niveum* (E.F.Sm.) Snyder & Hansen (*F. bulbigenum* Cke. & Mass. var. *niveum* (E.F.Sm.) Wr.), wilt. General, including Pacific Coast States.

F. scirpi Lambotte & Fautr., fruit rot. Occasional in eastern markets.

Helminthosporium sp., fruit rot. Tex.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Macrophoma sp. (*?M. citrulli* (Berk. & Curt.) Berl. & Vogl.), associated with blossom-end rot. Ga., Mo.

M. seminalis (Berk. & Curt.) Berl. & Vogl., on seeds and leaves. S.C.

Macrophomina phaseoli (Maubl.) Ashby, charcoal stem rot. Tex.

Marssonina melonis Dolan, anthracnose. N.Y.

Meloidogyne sp., root knot nematodes. N.C. to Fla., Tex., and Okla., Ariz., and Calif.

Mycosphaerella citrullina (C.O.Sm.) Gross., gummy stem blight, stem-end rot, leaf spot. Mass. to Fla., Ariz., and Mo.; P.R. The name *M. melonis* (Pass.) Chiu & J.C.Walker, based on *Didymella melonis* Pass., has been proposed for this, but it appears that if an earlier name than C.O.Smith's *Sphaerella citrullina* is to be selected the logical choice is *Sphaeria cucurbitacearum* Fr., described as an Ascomycete by Saccardo (*Laestadia cucurbitacearum* (Schw.) Sacc.) and by Cooke (*Sphaerella cucurbitacearum* (Schw.) Cke.). Specimens collected by Schweinitz, on which all these names are based, are clearly of this disease, and C.O.Smith also regarded them as probably identical but for nomenclatorial reasons applied a new name. On the other hand *Didymella melonis*, as described, varies in important respects from *M. citrullina.*

Phyllosticta citrullina Chester: SEE *Mycosphaerella citrullina.*

P. cucurbitacearum Sacc., reported on stems in Fla., Ga., Ky., Mo., is an earlier name for probably the same imperfect fungus.

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.

Physalospora abdita (Berk. & Curt.) N.E.Stevens, and *P. rhodina* (Berk. & Curt.) Cke., on dead stems. Fla. (1). SEE ALSO *Diplodia* spp.

Phytophthora spp., fruit rot, stem rot: *P. cactorum* (Leb. & Cohn) Schroet.—Ariz.; *P. capsici* Leonian —Colo.; *P. citrophthora* (R.E.Sm. & E.H.Sm.) Leonian—Calif.

?Pseudomonas lachrymans (E.F.Sm. & Bryan) Carsner, bacterial spot. Mich. Artificial inoculation reported negative on this host.

Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Occasional from Mass. to Fla., Tex., and Wis., also Calif.

Pythium spp., blossom-end rot, damping-off, root rot. The species most commonly associated with blossom-end rot and other decays of fruit are *P. acanthicum* Drechs.—Fla., Ga., Ind., Iowa, Md., Mo., Va.; *P. aphanidermatum* (Edson) Fitz.—Ariz. (also root rot), Fla., Va.; *P. irregulare* Buis.—Iowa; *P. ultimum* Trow—Calif.; the latter two also causing damping-off. Other species sometimes causing fruit rot are *P. artotrogus* (Mont.) d By.; *P. debaryanum* Hesse, *P. helicoides* Drechs.; *P. myriotylum* Drechs.—Fla., Ga.; *P. periplocum* Drechs.—Md., Va.

Rhizoctonia solani Kuehn, damping-off, soil rot (fruit) Pa. to Fla. and Iowa. Leaf blight—Ga., Tex.

Rhizopus spp. (chiefly *R. stolonifer* (Ehr. ex Fr.) Lind), mushy soft rot. Occasional.

Sclerotinia sclerotiorum (Lib.) d By., cottony rot. N.J., Tex.

Sclerotium rolfsii Sacc., southern blight, soil rot (fruit). N.C. to Fla., Tex., and Mo. The basidial stage, *Pellicularia rolfsii* (Curzi) E. West, has been produced in Tex. in cultures derived from this host.

Septoria citrulli Ell. & Ev., on leaves. N.J., N.Y. *S. cucurbitacearum* Sacc.—Wis.

Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Oreg., Utah.

Verticillium albo-atrum Reinke & Berth., wilt. Calif., N.H., Oreg.

Volutella citrulli Stonem., on fruit. N.Y.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.) Calif. (1,2); Ariz., Idaho, Oreg. (1).

MOSAIC—unidentified virus(es). N.Y. to Fla., Tex., and Iowa, also Ariz., Calif., Mich. (1); Iowa (2). Although the artificial transmission of cucumber mosaic virus (*Marmor cucumeris* Holmes) to watermelons has been reported several times, this host is generally resistant to the common strains of this virus, rarely showing systemic infection. Variant forms reported as crinkle mosaic in Tex., and ring spot in N.Y. and Wis., presumed to be of virus origin, are on record.

RING SPOT—virus (*Marmor annularium* McK., *Annulus tabaci* Holmes). Wis.

BLOSSOM-END ROT—in part, infection by *Pythium* spp. and various secondary organisms; in part, attributed to nonparasitic factors. Southeastern States.

INTERNAL BROWNING — physiological, attributed to drought or nutritional deficiencies. Fla., Ga., Kans., Mo. (1).

Cucumis

C. anguria L., West Indian gherkin.

Annual vine of tropical America, grown for ornament and the small fruits which are used in preserves. (Commercial "gherkins" are small cucumbers.)

Diplodia theobromae (Pat.) Nowell, fruit rot. V.I.
Erysiphe cichoracearum DC., powdery mildew. Mass.
Pellicularia koleroga Cke., thread blight. P.R.
Pseudomonas lachrymans (E.F.Sm. & Bryan) Carsner, angular leaf spot. Wis.
Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Ohio, Tex., V.I.

Cucumis melo L., muskmelon, including (1) var. *reticulatus* Naud., cantaloup of trade, and (2) var. *inodorus* Naud., cassaba, winter melon and honeydew.

Annual vine of southwestern Asia (or Africa ?), grown throughout the warmer parts of the United States; commercial production chiefly in California, Arizona, Texas, Colorado, Utah, and the Middle Atlantic, East Central, and Southeastern States; production of (2) chiefly in the Imperial Valley of California and in Arizona and Colorado.

Alternaria spp., Alternaria rot of fruit. General in transit and markets (1,2). Specific identity not usually reported, but sometimes referred to *A. brassicae* var. *microspora* Sacc. (=*A. oleracea* Milbrath, ? *A. circinans* (Berk. & Curt.) Bolle). *A. tenuis* Nees ex Cda. also commonly associated, perhaps secondary; also frequent on seed.
A. cucumerina (Ell. & Ev.) J. A. Elliott, leaf blight, black-mold blight. General (1), Colo. (2). Reported also as *A. brassicae* (Berk.) Sacc. var. *nigrescens* Pegl. (*A. nigrescens* (Pegl.) Neerg.), generally regarded as a synonym. The earlier name *A. cucurbitae* Letendre & Roum. is of doubtful application.
Cercospora sp., leaf spot. Colo., Ga., Tex.
C. citrullina Cke.—Guam.
C. cucurbitae Ell. & Ev.—Del., Ind., Tex.
Cladosporium cucumerimum Ell. & Arth., scab (foliage). Occasional in Eastern and Central States (1); also Cladosporium rot of fruit, on (1) and especially (2) in markets.
Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose of foliage and fruit. General in the East and South to Ariz., Colo., and N. Dak. (1,2). *Colletotrichum* sp. (? distinct) is reported in N.Y. as causing a destructive stem blight.
Cuscuta arvensis Beyrich, dodder. Md. (1).
Diplodia natalensis P. Evans, Diplodia rot, gray rot. Tex. (1). Conidial stage of *Physalospora rhodina*.
Erwinia aroideae (Town.) Holland (*Bacillus melonis* Giddings) and *E. carotovora* (L. R. Jones) Holland, bacterial soft rot. Occasional in markets in Eastern and Southern States (Mass. to Fla. and Tex.) (1). Bacterial blight, a disease of field-grown melons, attributed to *E. aroideae*, is reported in Ariz.
E. tracheiphila (E.F.Sm.) Holland, bacterial wilt. General east of Rocky Mts., also Ariz., Colo., Idaho, Wash. (1).
Erysiphe cichoracearum DC., powdery mildew. General, including Ariz., Calif., and Utah (1); Ariz., Calif. (2). See note under *Cucumis sativus*.
Fusarium spp., fruit rot. General in markets, occasional in fields, in the Eastern and Central States; also Ariz., Calif., Colo., Tex. (1,2). The following species identified: *F. culmorum* (W.G.Sm.) Sacc., *F. equiseti* (Cda.) Sacc., *F. graminum* Cda., *F. scirpi* Lambotte & Fautr. and vars. *acuminatum* (Ell. & Ev.) Wr. and *compactum* Wr., *F. semitectum* Berk. & Rav. (all synonyms of *F. roseum* (Lk.) emend. Snyd. & Hans.); *F. moniliforme* Sheldon var. *subglutinans* Wr.; *F. solani* (Mart.) Appel & Wr.
F. oxysporum Schlecht. f. *melonis* (Leach & Currence) Snyd. & Hans. (also reported as *F. bulbigenum* Cke. & Mass. var. *niveum* (E.F.Sm.) Wr.), Fusarium wilt. General (1) including the Eastern, Central, and Southern States, also the Far West, though different physiologic races may be involved; Ariz., Calif., Colo. (2).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot (root, stem, and fruit). Oreg., Tex. (1), Calif. (2).
Macrosporium cucumerinum Ell. & Ev.: See *Alternaria cucumerina*.
Marssonina melonis Dolan, anthracnose. N.Y. (1).
Meloidogyne sp., root knot nematodes. N.J. to Fla. and Calif. (1). Often associated with Fusarium wilt.
Monilia sitophila (Mont.) Sacc., fruit rot after prolonged storage. Ind., N.Y. (2). Conidial stage of *Neurospora sitophila* Shear & B. O. Dodge.
Mucor sp., fruit rot following cold storage. N.Y. (2).
Mycosphaerella citrullina (C.O.Sm.) Gross., gummy stem blight. Del., Mass., N.J., N.Y., Tex., P.R. (1); Fla. (2). See note under *Citrullus*.
Penicillium sp., blue-mold rot, usually after prolonged storage or low-temperature breakdown. Occasional in markets (1,2).
Phyllosticta sp., leaf spot. Ga., Ohio, Tex., P.R. (1). Probably *P. citrullina* Chester (=*P. cucurbitacearum* Sacc.?), a conidial stage of *Mycosphaerella citrullina*.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora rhodina (Berk. & Curt.) Cke., on dead stems. N.C.
Phytophthora spp., fruit rot: *P. cactorum* (Leb. & Cohn) Schroet.—Utah (1); *P. capsici* Leonian—Calif., Colo. (1,2); *P. drechsleri* Tucker—Calif. (2); *P. parasitica* Dast.—P.R. (1).
Pseudomonas lachrymans (E.F.Sm. & Bryan) Carsner, angular leaf spot. Calif., Colo., Del., Iowa, Md., ? Mich., N.J., Pa. (1); Colo. (2).
Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. General (1,2).
Pyrenochaeta terrestris (Hansen) Gorenz, J. C. Walker, & Larson, secondary root rot. Colo., Iowa (1,2).
Pythium aphanidermatum (Edson) Fitz., cottony leak (fruit rot), root rot. Ariz., Calif. (1,2); Tex. (1).
P. debaryanum Hesse, damping-off. Calif., Conn., Iowa, N.J., N.Y. (1).
P. periplocum Drechs., root rot. Calif. (2).
P. ultimum Trow, damping-off. Calif. (1,2).
Rhizoctonia solani Kuehn, damping-off, root rot. Calif., Ga., N.J. (1). Fruit rot—Fla., Tex. (1).
Rhizopus spp., mushy soft rot, *Rhizopus* rot. Cosmopolitan. Chiefly *R. stolonifer* (Ehr. ex Fr.) Lind (*R. nigricans* Ehr.), sometimes *R. tritici* K. Saito; various other species have been shown potentially pathogenic.
Sclerotinia sclerotiorum (Lib.) d By., stem rot, "timber rot." Ark., Mass., Tex. (1).
Sclerotium bataticola Taub.: See *Macrophomina phaseoli*.
Sclerotium rolfsii Sacc., southern blight (in fields). Va. and Ohio to Fla. and Tex. (1); sometimes fruit rot in markets.
Septoria cucurbitacearum Sacc., leaf spot. Del., Mass., Mich., N.H., N.Y., Pa., Vt., Wis. (1).

Trichoderma viride Pers. ex Fr., green-mold rot. Minn. (1).

Trichothecium roseum Lk. ex Fr., pink-mold rot. Occasional in markets—Ind., N.Y. (1); Calif. (1,2).

Verticillium albo-atrum Reinke & Berth., wilt. Calif. (1,2), Oreg. (1).

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Ariz., Calif., Idaho, Oreg., Tex., Utah, Wash. (1); Calif., Wash. (2).

MOSAIC — virus(es). In part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.—general (1); Ariz., Calif., N. Mex. (2). In part different viruses, identified as cantaloup mosaic virus (? squash mosaic virus) in Calif. and ?Ariz. (1,2); and as mild mosaic virus (*Marmor melonis* Rader, Fitzpatrick & Hildebrand) in N.Y. (1). Both are distinguished from ordinary cucumber mosaic by seed transmission in these hosts.

RING SPOT—virus (*Marmor annularium* McK., *Annulus tabaci* Holmes). Md., N.C., Pa., Va., Wis.

MAGNESIUM DEFICIENCY (physiological leaf spot) — N.Y. (1).

Cucumis sativus L., cucumber.

Annual vine of southern Asia, grown throughout the United States; commercial production for fresh market chiefly in the Gulf and Middle Atlantic States and in California and for processing in these regions and especially in Michigan, Wisconsin, Indiana, and Ohio. The var. *anglicus* Bailey, English forcing cucumber, is occasionally grown in greenhouses.

Alternaria cucumerina (Ell. & Ev.) J.A.Elliott, leaf blight. General. *A. cucurbitae* Letendre & Roum., as reported from Colo., Iowa, Minn., and N.J., is an earlier name but of doubtful application.

A. tenuis Nees ex Cda., seed mold. Cosmopolitan.

Ascochyta cucumis Fautr. & Roum., *A. citrullina* C.O.Sm.: SEE *Mycosphaerella citrullina*.

Botrytis cinerea Pers. ex Fr., gray-mold rot. Ill., Ohio, Wash.

Cercospora sp. (*?C. cucurbitae* Ell. & Ev.), leaf spot. Fla., Ga., Ind., Iowa, Ohio.

Choanephora cucurbitarum (Berk. & Rav.) Thaxt., blossom blight. Fla., Ga.

Cladosporium cucumerinum Ell. & Arth., scab of foliage and fruit. General, especially on greenhouse plants and on the pickle crop in the North Central States.

Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. General.

Curvularia trifolii (Kauff.) Boed., seed mold. N.J.

Cuscuta gronovii Willd., dodder. N.Y.

Diplodia natalensis P.Evans, gray rot. Tex.

Erwinia aroideae (Town.) Holland and *E. carotovora* (L.R.Jones) Holland, bacterial soft rot. Occasional in markets—Ala., Conn., N.J., Okla., P.R.

E. tracheiphila (E.F.Sm.) Holland, bacterial wilt. General.

Erysiphe cichoracearum DC., powdery mildew. General. Identification of the powdery mildew of cucurbits commonly found in the U.S. as this species rests on infection experiments with known cultures and such distinctive characteristics of the conidial stage as are known. Collections of the perithecial stage on cucumber are reported in Europe. *E. polygoni* DC. also has been reported but without conclusive evidence for such identification. No reports of *Sphaerotheca humuli* (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., as known on cucurbits in Europe, have been found in the U.S.

Fusarium spp., fruit rot. Tex. Wilt, sometimes ascribed to *F. oxysporum* ?f. *niveum* (E.F.Sm.) Snyd. & Hans., or ?f. *vasinfectum* (Atk.) Snyd. & Hans., but not confirmed and perhaps secondary, is occasionally reported from various localities, chiefly in greenhouses, in the North, also in the field in Calif., Mich., N. Mex., Tex., Wis.

F. solani (Mart.) Appel & Wr. f. *radicicola* (Wr.) Snyd. & Hans., root rot. Conn., Oreg., Wash.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Macrophomina phaseoli (Maubl.) Ashby, charcoal stem rot. Ill.

Meloidogyne sp., root knot nematodes. General in field culture from the Middle Atlantic and Central States southward and to Calif.; in greenhouse culture in the North.

Mycosphaerella citrullina (C.O.Sm.) Gross., gummy stem blight, black rot of fruit. Widespread, N.Y. to Fla. and Tex.; Calif., P.R.

Phyllosticta cucurbitacearum Sacc., leaf spot. Del., Ohio, Tex., P.R. Perhaps a conidial stage of the preceding.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Phytophthora sp., fruit rot. P.R.

P. capsici Leonian—Colo.

Pseudomonas lachrymans (E.F.Sm. & Bryan) Carsner, angular leaf spot, also on young fruit. General.

P. tabaci (Wolf & Foster) Stapp, bacterial leaf spot. Wis.

Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. General.

Pythium spp., damping-off, seed rot, fruit rot (cottony leak). Species most active in seedling blight are identified as *P. debaryanum* Hesse and *P. ultimum* Trow, reported generally in the Eastern and Central States, in fields and greenhouses. Cottony leak caused by *P. aphanidermatum* (Edson) Fitz. is reported from Ga., La., N.C., N.J., S.C., Va., P.R. Other species causing fruit rot: *P. anandrum* Drechs.—Calif.; *P. butleri* Subr., *P. oligandrum* Drechs., and *P. ultimum* Trow—Md.; *P. myriotylum* Drechs.—S.C.

Rhizoctonia solani Kuehn, damping-off, stem rot. Occasional, chiefly in greenhouses.

Rhizopus stolonifer (Ehr. ex Fr.) Lind, fruit rot. Occasional in markets.

Sclerotinia sclerotiorum (Lib.) d By., stem rot, fruit rot, "timber rot." Occasional in various localities, chiefly in greenhouses in the North (Mass. to N.J., Ill., and Minn.) and the Pacific Northwest; in fields in Calif., Tex., and Fla.

Sclerotium rolfsii Sacc., southern blight. Va. to Fla. and Tex.

Septoria cucurbitacearum Sacc., leaf spot. Del., Mass., N.H., Pa.

Stemphylium cucurbitacearum Osner (*?S. ilicis* Tengwall), leaf spot. Ind., Ohio.

Verticillium albo-atrum Reinke & Berth., wilt. Maine, Ohio, Oreg., Wash., Wis.

Xanthomonas cucurbitae (Bryan) Dows., bacterial spot. Mass., ? Mich.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif., Idaho, Oreg., Tex., Utah, Wash.

MOSAIC—virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.). Numerous strains distinguished by symptom differences in this host and by different host ranges are known. The one identified as western cucumber mosaic virus may be distinct. Cucumber also reacts with systemic chlorotic spotting to inoculation with the following viruses: alfalfa mosaic, celery calico, delphinium ring spot, and turnip mosaic.

RING SPOT—virus (*Marmor annularium* McK., *Annulus tabaci* Holmes). Ky., Md., Pa., Va.

CHLOROSIS—nutrient deficiency, of manganese: interveinal chlorosis—Fla.; of nitrogen: leaf yellowing, attenuation and chlorosis of bud end of fruit—general; of potassium: marginal bronzing and necrosis of leaves, fruit deformities—Ohio.

Cucurbita, pumpkin, squash

I. Winter Squashes

(1) *Cucurbita maxima* Dcne., winter squash.
(2) *C. moschata* Dcne., cushaw, winter crookneck pumpkin.

Coarse annual vines of unknown nativity; grown for edible fruit, which is capable of storage for some time in autumn or early winter.

Alternaria sp., fruit spot, storage rot. Mass., N.H., Oreg., Vt., Wash. (1).

A. cucumerina (Ell. & Ev.) J.A.Elliott, leaf blight. N.H., N.Y., Pa., Utah (1); Tex. (2). Perhaps also Idaho, Nebr., N.J. (1), reported as *Macrosporium lagenariae* Thuem., a name of indefinite standing.

A. tenuis Nees ex Cda., seed mold. Cosmopolitan.

Ascochyta sp., leaf spot. Oreg. (1): SEE *Mycosphaerella*.

Botrytis cinerea Pers. ex Fr., gray-mold rot. Idaho, Mass., N.H., Oreg., Wash. (1).

Cercospora cucurbitae Ell. & Ev., leaf spot. Del., Iowa, N.J., Wis. (1); Ala., Tex. (2).

Choanephora cucurbitarum (Berk. & Rav.) Thaxt. blossom blight, blossom-end rot of fruit. N.J., R.I. (1); Okla., Tex. (1,2).

Cladosporium cucumerinum Ell. & Ev., scab, storage rot. Conn., Mass., Md., N.J., N.Y., Oreg., Wash. (1). Somewhat resistant.

Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. N.J., N.Y., Pa., Tex. (1); Md., Tex. (2).

Coniosporium fairmani Sacc., black mold of fruit. N.Y. (1).

Diplodia natalensis P.Evans, gray rot. Tex. (1,2).

Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. Cosmopolitan (1,2).

E. tracheiphila (E.F.Sm.) Holland, bacterial wilt. Maine to N.J. and Wis., also Colo., Tex., Utah (1); Tex. (2). Also reported as causing storage rot—Mass., N.H. (1).

Erysiphe cichoracearum DC., powdery mildew. General (1); Ariz., Miss., Tex. (2). See note under *Cucumis sativus*.

Fusarium spp., fruit spot, storage rot. Colo., Mass., N.H., Oreg., Wash., Wis. (1).

F. avenaceum (Fr.) Sacc. (=*F. roseum* Lk. emend. Snyd. & Hans.)—Mass.

F. oxysporum Schlecht. f. *niveum* (E.F.Sm.) Snyd. & Hans., wilt. Ariz., N.C. (1); Tex. (1,2). Wilt attributed to unidentified *Fusarium* spp., perhaps secondary following squash-borer injury, is also reported in Calif., Colo., Ill., Mich., Tex., Wis. (1).

F. solani (Mart) Appel & Wr. f. *cucurbitae* Snyd. & Hans., root, stem, and fruit rot. Calif., N.Y., Wash. (1); Oreg. (1,2).

Gloeosporium sp., leaf spot. Ill. (1).

G. orbiculare Berk., on fruit. Mass., Nebr. (1).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot of roots and stems. Oreg. (1), Tex. (1,2).

Meloidogyne sp., root knot nematodes. Calif. (1); Fla., Tex. (1,2).

Mycosphaerella citrullina (C.O.Sm.) Gross., gummy stem blight, black rot of fruit. Mass. (1,2); Conn., Mich., N.H., N.J., N.Y., Pa. (1). See note under *Citrullus*.

Phoma subvelata Sacc., leaf spot, stem rot. Tex. (1).

Phyllosticta cucurbitacearum Sacc., leaf spot. Ind. (1) *?Mycosphaerella*.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).

Phytophthora cactorum (Leb. & Cohn) Schroet., fruit rot. Ariz.

P. capsici Leonian, wilt. Colo.

?Pseudomonas lachrymans (E.F.Sm. & Bryan) Carsner, angular leaf spot. Mich., N.H., N.Y. These records are doubtful since inoculation experiments indicate that squash and pumpkin are immune; perhaps confused with *Xanthomonas cucurbitae*.

Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Maine to Ala. and Tex., also Calif. (1); La., N.Y., Tex., P.R. (2).

Pythium aphanidermatum (Edson) Fitzp., root rot. Ariz.

P. debaryanum Hesse, damping-off. Conn., Wis.

P. ultimum Trow, fruit rot. Calif.

Rhizoctonia solani Kuehn, root and stem rot. Tex. (1,2).

Rhizopus spp. (chiefly *R. stolonifer* (Ehr. ex Fr.) Lind), storage rot, usually following injuries. General.

Sclerotinia sclerotiorum (Lib.) d By., stem rot, fruit rot. Idaho, Maine, Mass., Mont., N.H., N.Y., Pa., Wash. (1).

Sclerotium rolfsii Sacc., southern blight. Ala. (1).

Septoria cucurbitacearum Sacc., leaf and fruit spot. Mass., N.H., N.Y., Wis. (1).

S. vestita Berk. & Curt., on fruit. Pa.

Stemphylium sp. (*?S. cucurbitacearum* Osner, *S. ilicis* Tengwall), leaf spot. N.Y. (2).

Trichothecium roseum Lk. ex Fr., pink-mold rot. Mass. (1).

Verticillium albo-atrum Reinke & Berth., wilt. Oreg. (1).

Xanthomonas cucurbitae (Bryan) Dows., bacterial spot. Ga., Md., ? Mich., N.Y., Oreg., Pa. (1); Mass. (1,2).

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Idaho, N. Mex., Oreg., Utah, Wash. (1); Calif. 1,2).

MOSAIC—virus (in part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.). Mass. to Fla. and Calif. (1); Fla., Tex. (2). One or more strains or related viruses affecting summer squashes in Calif. may also be involved; see *Cucurbita pepo*.

RING SPOT—virus (*?Marmor annularium* McK., Nicotiana virus 12 K.M.Sm.). N.Y.

YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Maine, N. Dak., N.H. (1).

ANASA WILT—toxic effect of feeding of squash bug (*Anasa tristis*). N.H. (1), Utah (1,2), probably general.

II. Pumpkin, Summer Squash

(1) *Cucurbita pepo* L., pumpkin, vegetable-marrow.
(2) *C. pepo* var. *melopepo* (L.) Alef. (*condensa* Bailey), summer squash, bush squash.
(3) *C. pepo* var. *ovifera* (L.) Alef., yellow-flowered gourd.

Annual spreading (1,3) or compact (2) vines of uncertain origin (? tropical America); culti-

vated for edible fruit (1,2) or for ornament (3); short-lived in storage.

Alternaria sp., fruit rot. Minn., N.J., Wash. (1); N.Y. (2).

A. cucumerina (Ell. & Ev.) J.A. Elliott, leaf blight. Iowa, Minn., N.C., N.J., W. Va. (1); Del., Utah (2).

A. radicina Meier, Drechs., & Eddy, and *A. tenuis* Nees ex Cda., seed mold. Occasional.

Botrytis cinerea Pers. ex Fr., gray-mold rot. Idaho (1); Tex. (1,2); N.H., N.Y. (2).

Cercospora sp., leaf spot. Ind.

C. citrullina Cke.—Ala. (1).

C. cucurbitae Ell. & Ev.—Del., Ind., W. Va. (1); Ala., Md. (2).

Choanephora cucurbitarum (Berk. & Rav.) Thaxt., blossom blight, brown rot of fruit, Maine to Fla., Tex., and Mich. (1,2). Root rot (?secondary). Md., N.J. (1).

Cladosporium cucumerinum Ell. & Arth., scab, leaf spot. Mass., Md., N.Y., Pa. (2); Conn. (3).

Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. Conn. to N.J., Tex., and Kans. (1,3); Tex. ((2).

Curvularia trifolii (Kauff.) Boed., seed mold. Conn.

Diplodia natalensis P.Evans, gray rot of fruit. La., Tex.

Erwinia aroideae (Town.) Holland, and *E. carotovora* (L.R.Jones) Holland, bacterial soft rot. Calif., Conn., Md., Pa., Va., W. Va. (1,2).

E. tracheiphila (E.F.Sm.) Holland, bacterial wilt. General (1,2); Conn., Mass., Nebr. (3).

Erysiphe cichoracearum DC., powdery mildew. General (1,2); Conn., Pa. (3). In American collections based on conidial stage only, but supported by infection experiments with known cultures; *E. polygoni* DC., as reported on this host here, is apparently based on European records.

Fusarium oxysporum Schlecht. f. *niveum* (E.F.Sm.) Snyd. & Hans., wilt. Ariz., N. Mex. (2). Wilt attributed to unidentified *Fusarium* spp. is also reported from Md., N.J., Pa., Tex., Va. (1); Calif. (2).

F. solani (Mart.) Appel & Wr. f. *cucurbitae* Snyd. & Hans. (*F. javanicum* Koord. in part), root, stem and fruit rot. Calif., Conn. (2); N.Y. (2,3). Stem or fruit rot attributed to unidentified *Fusarium* spp. is also reported in Colo., Conn., Mass., Oreg., Tex., and W. Va. (1,2); N.Y., Tex. (3).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot of roots and stems. Oreg. (1,2).

Meloidogyne sp., root knot nematodes. Md. to Fla. and Tex. (1,2); Ariz., Md., Tex. (2).

Mycosphaerella citrullina (C.O.Sm.) Gross., gummy stem blight, black rot of fruit. Mass., Mich., N.J., N.Y. (1); Fla., Ga., Mass. (2); N.Y. (3). See note under *Citrullus*.

Phoma lagenariae (Thuem.) Sacc., on fruit. N.Y. (1).

P. subvelata Sacc., fruit spot. Tex. (3).

Phyllosticta orbicularis Ell. & Ev., leaf spot. Del., N.Y., ?Pa. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).

Phytophthora spp., fruit rot. *P. cactorum* (Leb. & Cohn) Schroet.—Ariz. (1); *P. capsici* Leonian—Va. (1), Mo. (2); *P. citrophthora* (R.E.Sm. & E.H.Sm.) Leonian—Calif. (1).

Pseudomonas lachrymans (E.F.Sm. & Bryan) Carsner, angular leaf spot. Conn., ?Mich. (1,2).

Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Mass. to Va., Iowa, and Wis. (1); Fla., Mass., N.Y., Va., P.R. (2); Ind., N.J., Ohio, Tex. (3).

Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, secondary root rot. N. Dak. (1).

Pythium aphanidermatum (Edson) Fitzp., blossom-end rot, root rot. Calif., Md., S.C., ?N.Y. (1,2); Ariz., Md. (2).

P. ultimum Trow, damping-off, fruit rot. Calif. (1,2).

Rhizoctonia solani Kuenn, root and stem rot. Tex. (1,2).

Rhizopus stolonifer (Ehr. ex Fr.) Lind, fruit rot. Conn., N.Y., Tex. (1,2).

Sclerotinia sclerotiorum (Lib.) d By., fruit rot. Idaho (1), Mont. (1,2), N.Y. (2).

Sclerotium rolfsii Sacc., southern blight. Fla., Ga. (1,2).

Septoria cucurbitacearum Sacc., leaf spot. Mass. (1,2).

Stemphylium cucurbitacearum Osner (*?S. ilicis* Tengwall), leaf and stem spot. Ind., Ohio (2,3), ?N.Y. Also reported as *Sporodesmium pluriseptatum* (Karst. & Har.) Pk. in Pa. (3). *S. botryosum* Wallr. and *S. consortiale* (Thuem.) Groves & Skolko have also been reported on seed.

Xanthomonas cucurbitae (Bryan) Dows., bacterial spot. Ill., Ind., Mass., Md., ?Conn., ?Mich. (1); ?Ga., Mass., Md., S.C., ?Mich. (2).

CURLY TOP—(*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Ariz., Calif., Idaho, N. Mex., Oreg., Utah, Wash. (1,2).

MOSAIC—virus(es) in part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.; in part one or more distinct strains or related viruses known as squash mosaic, cucurbit ring mosaic, and western cucumber mosaic, reported especially in Calif. but disseminated by seed elsewhere, the different types not distinguished in available records. Probably general, reported in Eastern and Southern States and Ariz., Calif., Colo., N. Mex., Wash. (1,2); Ind. (3).

RING SPOT—virus (*?Marmor annularium* McK., *Annulus tabaci* Holmes). W. Va. (1), Va. (2).

YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Maine (2).

ANASA WILT—toxic effect of feeding of squash bug (*Anasa tristis*). Utah (1,2).

TARGET SPOT (on fruit)—cause unknown but *Streptomyces* sp. suspected. Oreg. (2).

III. Native Species

(1) *Cucurbita foetidissima* H.B.K., buffalo gourd.

(2) *C. palmata* S.Wats.

Perennial vines of waste ground in the Southwest; useful to wildlife.

Cercospora cucurbitae Ell. & Ev., leaf spot. Kans., Tex. (1).

Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. Tex. (1).

Erysiphe cichoracearum DC., powdery mildew. Calif. (1).

MOSAIC—virus (*?Marmor melonis* Rader et al.). Calif. (1,2).

Echinocystis

(1) *E. lobata* (Michx.) Torr. & Gray, mock-cucumber.

Annual vine occurring throughout the Central and Eastern States to Texas and the Rocky Mountains; grown for ornament and screening; useful to wildlife.

(2) *E. fabacea* Naud.

(3) *Echinocystis oregana* (Torr. & Gray) Cogn., manroot.

Perennial-rooted vines of the Pacific Coast States.

Alternaria sp. (*?A. cucumerina* (Ell. & Ev.) J.A. Elliott), leaf spot. Fla. (1).
Cercospora echinocystis Ell. & Martin, leaf and fruit spot. N.J. to Fla., Nebr., and Wis. (1).
Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. Fla. (1).
Erysiphe cichoracearum DC., powdery mildew. Wis. (1).
Fusarium sp., wilt. Fla. (1).
Phleospora megarrhizae Ell. & Ev.: See *Septoria megarrhizae*.
Plasmopara australis (Speg.) Swing., downy mildew. Iowa, Kans., Minn., Ohio, Wis. (1).
Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Iowa, Ohio (1).
Septoria spp., leaf spot: *S. brencklei* Sacc., reported in Ill. and N. Dak. on (1) may be only a growth form of *S. sicyi* Pk., reported in Ill., Ind., Iowa, Mich., N. Dak., Wis., Wyo. (1). *S. megarrhizae* Ell. & Ev.—Calif., Oreg., Wash. (3); *Phleospora megarrhizae* Ell. & Ev. appears to be a growth form. *S. echinocystis* Ell. & Ev.—Calif.
Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Wash. (?3).
Mosaic—virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.). Colo., Ill., Ind., Mich., N.Y., Wis. (1); Calif. (2).

Lagenaria

L. siceraria (Mol.) Standl. (*L. leucantha* Rusby), calabash, white-flowered gourd.

Annual vine of tropical regions, widely cultivated for ornament; the dry shells of the fruits were used for primitive utensils.

Cercospora cucurbitae Ell. & Ev., leaf spot. Ala., Ind., P.R.
Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. Conn., Ill., Ind., Minn., Nebr., Pa.
Erysiphe cichoracearum DC., powdery mildew. Wis.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Laestadia cucurbitacearum (Fr.) Sacc., black rot of fruit. Pa. See note on *Mycosphaerella* under *Citrullus*.
Meloidogyne sp., root knot nematodes. Ala.
Pellicularia koleroga Cke., thread blight. Fla.
Phoma subvelata Sacc., fruit spot. Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pseudomonas lachrymans (E.F.Sm. & Bryan) Carsner, angular leaf spot. Wis.
Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Conn., Fla., Mass., Ohio.
?Stemphylium sp. (reported as *Macrosporium lagenariae* Thuem.), fruit spot. N.Y.
Mosaic—virus (*Marmor cucumeris* Holmes, Cucumis virus (1) K.M.Sm.). Ind., N.Y.

Luffa

(1) *L. acutangula* Roxb.
(2) *L. aegyptiaca* Mill. (*L. cylindrica* Roem.), dishcloth gourd, vegetable sponge.

Annual vines of tropical regions, cultivated for ornament and, especially (2), for the spongy fiber within the fruit, which is used for scouring.

Cercospora cucurbitae Ell. & Ev., leaf spot. Ala.
Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. Conn. (1,2), Iowa (1).
Erysiphe cichoracearum DC., powdery mildew. Conn. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla. (2).
Pellicularia koleroga Cke., thread blight. P.R. (2).
Pseudomonas lachrymans (E.F.Sm. & Bryan) Carsner, angular leaf spot. Wis.
Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Conn., Ohio, N.C. (1); Mass., P.R. (2).

Melothria

(1) *M. scabra* Naud.
(2) Other species.

Native or introduced, trailing or climbing vines; sometimes grown for ornament. Some of the native species are useful to wildlife.

Erysiphe cichoracearum DC., powdery mildew. Wis. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla. (2).
Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Ga., Ohio (1); Tex. (2).

Momordica

(1) *M. balsamina* L., balsam-apple.
(2) *M. charantia* L., balsam-pear.

Annual vines of tropical regions, grown for ornament and screening; (2) naturalized in Florida.

Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. Ind. (1,2).
Erysiphe cichoracearum DC., powdery mildew. Wis. (1,2).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla. (1,2).
Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Iowa (1,2).
Ramularia momordicae Heald & Wolf, leaf blight. Tex. (1).

Sechium

S. edule (Jacq.) Sw., chayote.

Vine of tropical America with perennial tuberous roots, grown in warm regions for edible fruit; in some localities a valuable honey plant.

Cercospora sechii Stevenson, leaf spot. Fla., Tex., P.R.
C. cucurbitae Ell. & Ev.—Tex.
Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. Fla., Tex.
Glomerella cingulata (Ston.) Spauld. & Schrenk, fruit rot. La.
Helminthosporium sechicola Stevenson, on leaves. P.R.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.
Mycosphaerella citrullina (C.O.Sm.) Gross., black rot. P.R. See note under *Citrullus*.
Phyllosticta sechii E. Young, leaf spot. P.R.
Sclerotium rolfsii Sacc., southern blight. Tex.

Sicana

S. odorifera Naud., curuba, cassabanana.

Coarse perennial-rooted vine of South America, sometimes grown in the Gulf States for edible fruit.

Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. Fla.

Sicyos

S. angulatus L., bur-cucumber.

Annual vine of the Eastern and Central States and southward, sometimes grown for screening but persisting as a weed; useful to wildlife.

Cephaleuros virescens Kunze, green scurf. P.R.
Cercospora echinocystis Ell. & Martin, leaf spot. Ill., N.J., Tex., Wis.
Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. Iowa.
Erysiphe cichoracearum DC., powdery mildew. Tex., Wis.
Mycosphaerella sp. (*Sphaerella sicyicola* Ell. & Ev.), leaf spot. Mo. Probably = *M. citrullina;* see note under *Citrullus.*
Phyllosticta sicyna Sacc., on leaves. N.Y., Tex.
Plasmopara australis (Speg.) Swing., downy mildew. Mass. to Mo., Nebr., and Wis.
Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Tex.
Septoria sicyi Pk., leaf spot. N.Y., Tex.
MOSAIC—virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.). Mich., Wis.

Trichosanthes

T. anguina L., snakegourd.

Annual vine of India, grown as a novelty for the odd-shaped fruits.

Colletotrichum lagenarium (Pass.) Ell. & Halst., anthracnose. Md.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophoma trichosanthis Syd., fruit spot. Ala.
Meloidogyne sp., root knot nematodes. Fla. (on *T. cucumeroides* Maxim.).
Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew. Mass., Ohio.

CUPRESSACEAE [3]

Chamaecyparis

I. Eastern Species

Chamaecyparis thyoides (L.) B.S.P., Atlantic white-cedar.

Range 26,27,28,29,30,31. Forest tree, wood used commercially; also cultivated for ornament, zone 3.

Aleurodiscus nivosus (Berk. & Curt.) Hoehn. & Litsch., bark patch. N.J.
Armillaria mellea Vahl ex Fr., root rot. Va.
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches. Ga., S.C.
Caliciopsis thujina (Ell.) Fitz., on dead foilage. N.J.
Cytospora pustulata Ell. & Ev., on dead branches. N.J. An invalid name.
Didymascella chamaecyparissi (Adams) Maire, on foliage, ?tip blight. N.J.
Diplodia thyoidea Cke. & Ell., on bark. N.J.
Fomes annosus (Fr.) Cke., wood rot. ?Mich.
F. subroseus (Weir) Overh., brown crumbly rot. N.C., N.J.
Gymnosporangium biseptatum Ell. (III), rust gall on stems and foliage. Maine and N.H. to N.J.; Ala. O and I on *Amelanchier canadensis* and *A. intermedia.*
G. ellisii (Berk) Farl. (III), witches'-broom. Maine to Fla. and Ala. O and I on *Comptonia* and *Myrica.*
G. fraternum Kern (*G. transformans* (Ell.) Kern) (III), rust gall on foliage. Maine, Mass., N.J. O and I on *Aronia arbutifolia.*
Hendersonia thyoides Cke. & Ell., on foliage. N.J.
Hysteromyxa effugiens Sacc. & Ell., on dead foliage. N.J.
Keithia chamaecyparissi Adams: SEE *Didymascella chamaecyparissi.*
Lenzites saepiaria Wulf. ex Fr., brown pocket rot. Va.
Lophodermina cupressi-thyoides (Sacc.) Tehon, on foliage. N.J.
Monochaetia unicornis (Cke. & Ell.) Sacc., on foliage, ?tip blight. Ga., N.J.
Nectria thujana (Rehm) Sacc., on dead foliage. N.J.
N. truncata Ell., on dead bark. N.J.
Pestalotia funerea Desm., on moribund foliage, ?tip blight. Mich., N.J. SEE ALSO *Monochaetia.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. N.J.
P. thyoides (Cke. & Ell.) Sacc.—N.J.
Pithya cupressina (Batsch. ex Fr.) Fckl., on dead foliage. N.J., N.Y.
Polyporus abietinus Dicks. ex Fr., wood rot. Maine.
P. pinsitus Fr.—N.C., Va.
P. sector Ehr. ex Fr.—N.C.
Poria papyracea (Schw.) Cke., on dead wood. N.J., N.Y., Pa.
P. rufa (Schrad. ex Fr.) Cke.—N.J., ?Pa.
Steccherinum ballouii Banker, wood rot. N.J.
Trichosphaeria cupressina Rehm, on dead foliage. N.J.
Venturia cupressina Rehm, on dead foliage. N.J.

II. Western and Introduced Species

(1) *Chamaecyparis lawsoniana* (A. Murr.) Parl., Port Orford, or Lawson, white-cedar. Range 1 and 2; also cultivated, zone 5.

(2) *C. nootkatensis* (Lamb.) Spach, Alaska, or Nootka, yellow-cedar. Range 1,4, and southeastern Alaska; also cultivated, zone 4.

(3) Other species, chiefly *C. obtusa* (Sieb. & Zucc.) Endl., Hinoki cypress, and *C. pisifera* (Sieb. & Zucc.) Endl., sawara-cypress, of Japan, cultivated in many horticultural forms as *Retinospora;* zone 3.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Calif. (1).
Asterina cupressina Cke. (*?Caliciopsis thujina* (Ell.) Fitz.), on foliage. Alaska (2).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1).
Coryneum cardinale Wagener, branch and twig canker. Calif. (1).

[3] This group has been treated by most authorities as a subfamily of Pinaceae, but in accord with Bailey in Hortus and Manual of Cultivated Plants, is segregated here as a family.

Fomes pini (Brot. ex Fr.) Karst., butt rot, heart rot. Oreg. (1), Alaska (2).
F. pinicola (Sw. ex Fr.) Cke.—Alaska 2).
Gymnosporangium nootkatense (Trel.) Arth. (II, ?III), leaf rust. Oreg., Wash., Alaska (2). O and I on native *Malus* and *Sorbus*.
Lenzites saepiaria Wulf. ex Fr., wood rot. Alaska (2).
Pestalotia funerea Desm., on foliage, ?tip blight. N.J., Tex. (3).
Phomopsis juniperovora Hahn, twig blight. Kans., N.C. (1,3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Phytophthora lateralis Tucker & J.A.Milbrath, root and collar rot. Oreg., Wash. (1), also some varieties of *C. obtusa*.
Poria lenis Karst., white pocket rot. Alaska (2).
P. weirii Murr., brown heart rot. Idaho, Wash. (2).
P. xantha (Fr.) Cke.—Alaska (2).
Pythium ultimum Trow, rootlet rot. Calif. (1).
Sphaeropsis juniperi Pk., on twigs. Fla. (3).
Trametes isabellina Fr., white pocket rot. Calif. (1).
Venturia lanea Dearn., on twigs. Wash. (2).
SUN SCORCH, TWIG BLIGHT—in part physiological, induced by drought and heat, of which most *Chamaecyparis* spp. are intolerant; winter injury and damage by spider mites are often accessory factors. General.

Cupressus, cypress

(1) *C. arizonica* Greene, including var. *bonita* Lemm. (*C. glabra* Sudw.), Arizona cypress. Range 11,14; cultivated, zone 7.
(2) *C. macrocarpa* Hartw. ex Gord., Monterey cypress. Range 5; cultivated in southern California.
(3) *C. sempervirens* L., Italian cypress, especially the var. *stricta* Ait., columnar Italian cypress. Native of southern Europe; cultivated, zone 7.
(4) Other species.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Ariz. (1).
Cercospora ?thujina Plakidas, twig blight. La. (3).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1,3).
Coniophora puteana (Schum. ex Fr.) Karst., wood rot, Calif. (2).
Coryneum asperulum Lombard & Davidson, on twigs, ?canker. Ala. (3).
C. berckmanii J. A. Milbrath—Oreg. (3).
C. cardinale Wagener, canker, dieback. Calif. (2,3). On planted but not on native trees.
Cytospora cenisia Sacc., f. *Littoralis* Zentmeyer (= *Valsa cenisia* De N.?), twig and branch canker. Calif. (1,2,3).
Diaporthe eres Nits., on twigs. Ga., Tex. (3).
Diplodia cyparissa Cke. & Harkn., on twigs, ?canker. Calif. (2), Ga. (3). SEE ALSO *Macrophoma*.
Fomes pini (Brot. ex Fr.) Karst., heart rot. Calif. (4).
Fusarium solani (Mart.) Appel & Wr., seedling blight. Tex. (3).
Gymnosporangium cupressi Long & Goodding (III), rust. Ariz. (1). O and I on *Amelanchier mormonica*.
Lenzites saepiaria Wulf. ex Fr., wood rot. Calif. (2).
L. striata Sw. ex Fr.—Fla. (3).
Lophodermium sp., on foliage, ?needle cast. N.J. (3).
Macrophoma cupressi (Cke. & Harkn.) Berl. & Vogl., twig blight, canker. Ala., Tex. (1); Calif. (2); Fla., Tex. (3). Perhaps a growth stage of *Diplodia cyparissa*.
Monochaetia ?unicornis (Cke. & Ell.) Sacc., on foliage, ?dieback. Miss., Tex. (1).
Pestalotia funerea Desm., on foliage, ?twig blight. Tex. (1,2,3); Calif. (2).
Phomopsis juniperovora Hahn, twig blight. Md., N.C., Va. (1); N.C. (2,3).
P. occulta (Sacc.) Trav., on dead or moribund twigs. Calif., Tex. (3).
Phoradendron densum Torr., mistletoe. Ariz., Calif., Oreg. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (1,3).
Polyporus spp., wood rot: *P. albidus* Schaeff. ex Fr., *P. carbonarius* (Murr.) Rhoads, *P. cutifractus* (Murr.) Rhoads, *P. versicolor* L. ex Fr.—all in Calif. (2). *P. basilaris* Overh., brown pocket heart rot. Calif. (2).
Poria subacida Pk., wood rot. Ariz. (1).
Steccherinum ochraceum (Pers. ex Fr.) S.F. Gray, wood rot. Calif. (2).
Stigmatea sequoiae (Cke. & Harkn.) Sacc., on leaves. Calif. (2).

Juniperus

I. Native Junipers

(1) *Juniperus communis* L., common juniper, including various cultural and geographic varieties, as *depressa* Pursh, prostrate juniper; *hibernica* Gord., Irish juniper; and *saxatilis* Pall. (*J. sibirica* Burgsd.), mountain juniper. Small to large evergreen shrubs ranging nearly throughout the United States; cultivated for ornament in numerous horticultural varieties, zone 2; useful to wildlife.
(2) *J. horizontalis* Moench, creeping juniper. Range 12,15,18,21,23,24,26,27; cultivated, zone 2; useful to wildlife.
(3) *J. pachyphloea* Torr., alligator juniper. Range 11,14,17. Small to medium-sized evergreen tree; wood used commercially; cultivated, zone 7; useful to wildlife.
(4) *J. scopulorum* Sarg., Rocky Mountain juniper, western redcedar. Range 2,6,7,9, 11,12,13,14,15,16. Small to medium-sized tree; cultivated, zone 5; useful to wildlife.
(5) Other species.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Calif. (2,5); Miss. (2).
Aleurodiscus nivosus (Berk. & Curt.) Hoehn. & Litsch., bark patch on dead or living trees. Ala., Oreg., Tex. (5).
Alternaria sp., secondary needle blight. Tex. (1).
Apiosporium pinophilum Fckl., sooty mold. Oreg., Wash.
Aposphaeria fibricola (Berk.) Sacc., on wood. N. Mex. (3).
Asterina cupressina Cke. (*?Caliciopsis thujina* (Ell.) Fitzp.), on foliage. Wis. (1).
Cenangella deformata (Pk.) Sacc., on dead branches. Colo. (4); Mont., Wyo. (5).
Cercospora sequoiae Ell. & Ev. var. *juniperi* Ell. & Ev., on foliage, needle cast. Conn., Wis. (1); Ky., Okla. (5). Also referred doubtfully to *Exosporium deflectens* Karst. SEE ALSO *Coryneum juniperinum*.
Chlorocypha juniperina (Ell.) Seaver, needle blight. Iowa, N.C. (1).

Coccomyces juniperi Karst., on twigs. Ala. (1).
Coniophora corrugis Burt, wood rot, sometimes on living trees. Ariz., Colo., Wyo. (4).
Coryneum juniperinum Ell., on foliage. Iowa, Utah (1). Perhaps *Exosporium glomerulosum* (Sacc.) Hoehn.
Cyanospora albicedrae Heald & Wolf, on twigs and branches, white blight. Tex. (on *J. mexicana* Schlecht.). Also referred to *Robergea albicedrae* (Heald & Wolf) Sacc. & Trav.
Daedalea juniperina Murr., wood rot. Ariz. (5).
Dimerium juniperi Dearn., on foliage. Calif. (5).
Diplodia pinea (Desm.) Kickx (*Sphaeropsis ellisii* Sacc.), on twigs, ?dieback. N.J.
Dothidella juniperi (Desm.) Hoehn., on foliage. Iowa (1), N. Dak. (2). Also reported as *Laestadia juniperina* (Ell.) Sacc.
Exosporium betheli Dearn., on foliage. Calif. (5). *?E. glomerulosum* (Sacc.) Hoehn.
Fomes spp., wood rot of heartwood in living trees or dead trunks:
F. annosus (Fr.) Cke.—(1).
F. earlei (Murr.) Sacc. & D. Sacc., yellow pocket rot. Ariz., Calif., Colo., N. Mex., Tex. (5). Usually considered a synonym of *F. juniperinus* (Schrenk) Sacc. & Syd.—Mont. (1); also referred to *F. demidoffi* (Lév.) Sacc.
F. roseus (Alb. & Schw. ex Fr.) Cke. (including *F. subroseus* (Weir) Overh.), brown pocket rot. Mont. to Ariz. and Calif. (3,4.5).
F. texanus (Murr.) Hedgc. & Long, brown stringy rot. Ariz., N. Mex., Tex. (5).
Gymnosporangium aurantiacum Chev. (III), rust gall (on twigs and leaves). Colo., Maine, Mich. (1). O and I on *Sorbus* spp.
G. betheli Kern (III), rust gall (branches). N. Dak. to Tex., Colo., and Wash. (4); Oreg. (5). O and I on *Crataegus* spp.
G. clavariaeforme (Jacq. ex Pers.) DC. (III), rust gall (branches). General (1). O and I on *Amelanchier* spp.
G. clavipes Cke. & Pk., (III), rust gall (twigs). General (1). O and I on various Malaceae.
G. corniculans Kern (III), rust gall (branches) Maine, Mich., Wis. (2). O and I on *Amelanchier* spp.
G. davisii Kern (III), rust (leaves and twigs). Maine, Wis. (1). O and I on *Aronia* spp.
G. exiguum Kern (III), leaf rust. Okla., Tex. (3,5). O and I on *Crataegus* spp.
G. globosum Farl. (III), rust gall (branches). N. Dak., N.J. (2). O and I on various Malaceae.
G. harknessianum (Ell. & Ev.) Kern (III), needle rust. Calif., Oreg. (5). O and I on *Amelanchier alnifolia.*
G. inconspicuum Kern (III), rust gall (twigs). Calif., Colo., Utah (5). O and I on *Amelanchier* spp.
G. juniperinum (L. ex Pers.) Mart. (III), rust gall (twigs). Mont. to Colo. and Wash. (on *J. communis* var. *saxatilis*); Utah (2). O and I on *Sorbus.*
G. juniperi-virginianae Schw. (III), rust gall, cedar-apple. Colo., Ill., Nebr. (4); Ala. (5). O and I on *Malus* spp.
G. juvenescens Kern (III), rust witches'-broom. S. Dak. to N. Mex., Utah, and Wash. (2,4). Perhaps a synonym of *G. nidus-avis.* O and I on *Amelanchier* spp.
G. kernianum Bethel (III), rust witches'-broom. Ariz., N. Mex. (3); Calif., Colo., Idaho, Nev., Oreg., Utah (5). O and I on *Amelanchier* and *Pyrus.*
G. multiporum Kern (III), rust gall (twigs). N. Mex. (3,5); Calif., Colo. (5). O and I unknown.
G. nelsoni Arth. (III), rust gall (branches). Mont., S. Dak (2); N. Dak. to N. Mex., Utah, and Oreg. (4,5). O and I on various Malaceae.
G. nidus-avis Thaxt. (III), rust witches'-broom. Maine, Mont., N. Dak., Wis. (2).
G. speciosum Pk. (III), rust gall (branches). Ariz., Colo., Nev., N. Mex., Utah (3,5). O and I on *Fendlera* and *Philadelphus.*
G. tubulatum Kern (III), rust gall (branches). Wyo. (2,4); Idaho, Mont., Wash. (4).
G. vauqueliniae Long & Goodding (III), rust witches'-broom. Ariz. (5). O and I on *Vauquelinia californica.*
Herpotrichia nigra Hartig, brown felt blight. Mont. to Colo., Calif., and Oreg. (1,2,3).
Keithia tetramicrospora Shope, needle blight. Colo. (4). *Keithia* is an invalid name as applied to a fungus.
Laestadia juniperina (Ell.) Sacc. SEE *Dothidella juniperi.*
Lenzites saepiaria Wulf. ex Fr., and *L. trabea* Pers. ex Fr., wood rot. Ariz. (3).
Lophodermium juniperinum (Fr.) de N., on foliage, ? needle cast. Maine to Colo. and Wash. (1); Mass. (2).
Microdiplodia ?cupressina (Cke.) Tassi, on twigs, dieback. Wash. (5).
Pestalotia funerea Desm., needle blight (?secondary). Calif., Ga., Ill., Mich., N.J., S.C., Tex. (*).
Phomopsis juniperovora Hahn, twig blight. Mass. to N.C., Kans., and Nebr.; ?Tex. (*).
P. occulta (Sacc.) Trav., secondary twig blight. Widespread.
Phoradendron densum Jepson and *P. juniperinum* Engelm., mistletoe. Ariz., Calif., N. Mex. (3,4,5); Utah (5).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (*).
Pithya cupressina (Batsch ex Fr.) Fckl., on dead foliage. Ga., Mich., Wis. (2); Wash. (5).
Polyporus pinsitus Fr., wood rot. Ga., Tex. (1).
Poria cocos Wolf, on roots. Fla. (1).
P. ferox Long & Baxter, brown cubical rot. N. Mex. (5).
Rhizoctonia solani Kuehn, damping-off. Tex. (4).
Septogloeum ?sulphureum Syd., on twigs. Pa. (1).
Sphaeropsis spp., on twigs and branches. SEE *Diplodia, Macrophoma,* and *Physalospora.*
Stagonospora pini Grove, on foliage, ? needle blight. Tex. (5).
Trametes sepium Berk., wood rot. N. Mex. (5). *T. serialis* Fr.—Wyo. (4).
Tryblidiopsis occidentalis Tracy & Earle, on dead twigs. Colo. (5).

II. Introduced Species, Cultivated

(1) *Juniperus chinensis* L., especially var. *pfitzeriana* Spaeth., Chinese juniper. China and Japan; cultivated, zone 4.
(2) *J. excelsa* Bieb., Greek juniper. Southeastern Europe; cultivated, zone 7.
(3) *J. sabina* L., savin. Southern Europe and southwestern Asia; cultivated, zone 4. In America this name has been mistakenly applied to *J. horizontalis.*
(4) Other species.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Fla. (1), Calif. (3,4), Miss. (3).
Cenangella helotioides (Mont. & Sacc.) Rehm, on twigs. Oreg. (1).
Coryneum cardinale Wagener, canker. Calif. (1,3).
Gymnosporangium haraeanum Syd. (III), leaf rust. Conn., Oreg., Wash. (1). O and I on *Pyrus sinensis.*
G. japonicum Syd. (III), rust gall. Conn., Mass., N.J., Wash. (1). O and I on *Photinia arbutifolia.*

?Gymnosporangium juniperi-virginianae Schw. (III), rust gall. Okla. (1). So reported, but experimentally this rust has failed to infect this host.
Lophodermium juniperinum (Fr.) de N., on foliage, ? needle cast. Mass. (1); Conn., Oreg. (2); Wash. (3).
Pestalotia funerea Desm., on foliage, ?dieback. N.J. (1,2).
Phomopsis juniperovora Hahn, twig blight. ?Tex. (1); Mass. to Va., Okla., and Nebr., Conn., N.J. (2); Mass., N.Y. (3); N.J. (4). *P. occulta* (Sacc.) Trav., secondary twig blight. Widespread (*).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Phytophthora cactorum (Leb. & Cohn) Schroet. and *P. citrophthora* (R.E.Sm. & E.H.Sm.) Leonian, root rot. Calif. (3).
Pithya cupressina (Batsch ex Fr.) Fckl., on dead foliage. Md. (1).

III. Redcedars

(1) *Juniperus virginiana* L., Eastern redcedar. Range 18,20,21,22,23,24,25,26,27,28,29; cultivated in several horticultural varieties; wood commercially important; useful to wildlife.

(2) *J. silicicola* (Small) Bailey, Southern redcedar. Range 29,30; wood used commercially; useful to wildlife.

Aleurodiscus nivosus (Berk. & Curt.) Hoehn. & Litsch. bark patch. Mass. to Fla., Tex., and Kans. (1).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches, ?canker. Ala., N.J., Va. (1).
Caliciopsis nigra (Schrad. ex Fr.) Fitz., on branches associated with galls. N.Y. (1).
Cenangella deformata (Pk.) Sacc., on dead branches. N.Y. (1).
Cercospora sequoiae Ell. & Ev. var. *juniperi* Ell. & Ev., on foliage, ?needle cast. Wis. (1). Perhaps = *Exosporium glomerulosum* (Sacc.) Hoehn.
Chloroscypha cedrina (Cke.) Seaver, on foliage. N.C., N.Y. (1).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (2).
Coccodothis sphaeroidea (Cke.) Th. & Syd., on foliage. Ga., La., S.C. (1).
Daedalea juniperina Murr., wood rot. Ark., Kans., Mo., N.Y., S.C., Va. (1).
D. westii Murr.—heart rot. Fla. (1,2), S.C. (2).
Diplodia spp.: *D. kansensis* Ell. & Ev., on bark in Kans., and *D. virginiana* Cke. & Rav., on twigs in S.C., have been reported once but are indeterminable.
Dothidella juniperi (Desm.) Hoehn., on foliage. Md. (1).
Fomes spp., heartwood rot of dead or living trunks:
F. annosus (Fr.) Cke., white spongy rot. Del., Mass., Md., N.C., N.Y. (1).
?F. demidoffii (Lév.) Sacc., yellow pocket rot. Fla. (2). Perhaps includes *F. juniperina*.
F. juniperina (Schrenk) Sacc. & Syd. (*F. earlei* (Murr.) Sacc. & D. Sacc.), yellow pocket rot. Ky., Md., Tenn. (1).
F. pini (Brot. ex Fr.) Karst., red ring rot. Mass. (1).
F. roseus (Alb. & Schw. ex Fr.) Cke. (including reports of *F. subroseus* (Weir) Overh. and *Trametes carnea* of American authors), brown pocket rot of dead trunks and timber. Ala., Fla., Md., Pa., Va. (1).
F. texanus (Murr.) Hedgc. & Long, brown stringy heart rot. Tex. (1).
Gymnosporangium bermudianum (Farl.) Earle (O,I, III), rust gall. Ala., Fla., La., Miss. (1,2).
G. clavipes Cke. & Pk. (III), rust gall (branches). General (1). O and I on various Malaceae.
G. corniculans Kern (III), rust gall (branches). N.Y. (1). O and I on *Amelanchier* spp.
G. davisii Kern (III), leaf rust. Fla. (1). O and I on *Aronia*.
G. effusum Kern (III), rust gall (branches). Md., N.J., N.Y., S.C., Va. (1). O and I probably on *Aronia*.
G. exiguum Kern (III), leaf rust. Tex. (1). O and I on *Crataegus*.
G. exterum Kern (III), rust gall (branches). Ky. (1). O and I on *Porteranthus*.
G. floriforme Thaxt. (III), rust gall (leaves and branches). S.C. to Fla., Tex., and Okla. (1). O and I on *Crataegus*.
G. globosum Farl. (III), rust gall (branches). General (1), Ala. (2). O and I on various Malaceae.
G. juniperi-virginianae Schw. (III), rust gall, cedar-apple. General (1), Ala. (2). O and I on *Malus* spp.
G. nidus-avis Thaxt. (*G. juvenescens* Kern) (III), witches'-broom. Maine to Fla., Miss., and Nebr. (1); Fla. (2). O and I on *Amelanchier* spp.
G. trachysorum Kern (III), rust gall on branches. La., Miss., S.C. (1). O and I on *Crataegus* spp.
Keithia juniperi J. K. Miller, on foliage. N.C. An invalid name.
Lenzites vialis Pk., wood rot. Pa. (1).
Lophodermium juniperinum (Fr.) de N., on foliage, ? needle cast. Mass., N.Y., Wash., Wis. (1).
Macrophoma juniperina Pk., on dead branches. N.Y. (1).
Macroplodia sabina House, on dead branches. Kans., Mich., N.Y. A *Sphaeropsis*, perhaps conidial stage of *Physalospora*.
Mytilidion decipiens (Karst.) Sacc. (=*M. tortile* (Schw.) Sacc. ?), on bark (saprophytic), sometimes on living trees. Kans., Mass., N.C., N.J.
Pestalotia funerea Desm., on foliage, needle blight (secondary). Mich., N.J., Tenn., Tex., Wis. (1).
Phomopsis juniperovora Hahn, twig blight. Mass. to N.C., Kans., and Minn. (1); also reported in the Gulf States, but probably confused with *P. occulta*.
P. occulta (Sacc.) Trav., on moribund foliage. Widespread.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Physalospora abdita (Berk. & Curt.) N. E. Stevens, on dead branches. Ga., La. (1,2).
P. cupressi (Berk. & Curt.) Sacc.—N.Y. (1).
P. obtusa (Schw.) Cke.—Md., N.J., N.Y., Va. (1).
Pithya cupressina (Batsch ex Fr.) Fckl., on dead foliage. Mass., Md., Va. (1).
Polyporus spp., wood rot, usually on dead trunks or branches; distribution cosmopolitan or as noted: *P. adustus* Willd. ex Fr.; *P. caesius* Schrad. ex Fr.; *P. dichrous* Fr.; *P. gilvus* (Schw.) Fr.; *P. pinsitus* Fr.—Mo., Tex.; *P. versicolor* L. ex Fr.
Poria cocos Wolf, on roots, tuckahoe. N.C.
P. juniperina (Murr.) Sacc. & Trott., wood rot. La. (2) *P. purpurea* (Fr.) Cke.—Iowa (1); *P. subacida* Pk.—N.Y. (1).
Sphaeropsis spp., on twigs and branches. SEE *Macrophoma*, *Macroplodia*, and *Physalospora*.
Stagonospora pini Grove, on twigs. Tex. (1).
Stigmatea juniperi (Desm.) Wint., on foliage. N.J. (1).
Streptothrix spp. (usually *S. atra* Berk. & Curt.), saprophytic on living or dead bark. Mass., Mich., N.J., N.Y. (1).
Trametes americana Overh., wood rot. N.Y. (1).
T. sepium Berk.—Mo., Va. (1).
Valsa cenisia De N. (=*V. ceratophora* Tul.?), on dead branches. Del., Mich., N.J. (1).

Libocedrus

L. decurrens Torr., incense-cedar.

Range 1,4,5; cultivated, zone 5. Wood important commercially; useful to wildlife.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Ariz., Calif.
Camaropycnis libocedri Cash, on twigs or foliage. Calif. Associated with *Parksia libocedri.*
Chloroscypha jacksonii Seaver, on twigs. Calif.
Coryneum cardinale Wagener, branch canker. Calif.
Fomes pini (Brot. ex Fr.) Karst., red ring rot. Oreg.
F. pinicola (Sw. ex Fr.) Cke., brown crumbly heart rot. Calif., Oreg.
Gymnosporangium libocedri (P. Henn.) Kern, rust gall on leaves and branches, witches'-broom. Calif., Nev., Oreg. O and I on various Malaceae.
Herpotrichia nigra Hartig, brown felt blight. Calif.
Lentinus lepideus Fr., brown cubical rot of dead trunks and timber. Calif.
Lenzites saepiaria Wulf ex Fr., wood rot. General.
Lophodermium juniperinum (Fr.) de N., needle cast (secondary). Calif., Oreg.
Parksia libocedri Cash, on twigs. Calif.
Phoradendron juniperinum Engelm. var. *libocedri* Engelm., mistletoe. Calif., Nev., Oreg.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pithya cupressina (Batsch ex Fr.) Fckl., on foliage. Calif.
Polyporus spp., wood rot, usually of dead trunks and branches: *P. abietinus* (Dicks. ex Fr.) Cke.—Calif.; *P. amarus* Hedgc., pecky heart rot, pin rot. Calif., Oreg.; *P. versicolor* L. ex Fr.—Calif.; *P. volvatus* Pk.—Calif.
Stereum hirsutum Willd. ex Fr., on dead branches. Calif.
Stigmatea sequoiae (Cke. & Harkn.) Sacc., on foliage. Calif.
Trametes isabellina Fr., white pocket rot. Calif.
Tryblidiella macrospora Bonar & Cash, on dead branches. Calif.

Thuja

T. occidentalis L., American (Eastern) arborvitae (northern white-cedar). Range 22,23, 24,26,27.

Evergreen tree cultivated for ornament in numerous (mostly dwarf) horticultural forms, zone 2.

Aleurodiscus nivosus (Berk. & Curt.) Hoehn. & Litsch., bark patch. Mich.
Armillaria mellea Vahl ex Fr., root rot. Mich., N.Y., Tex.
Ceratostomella sp., wood stain. Ill.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Didymascella thujina (Durand) Maire (*Keithia thujina* Durand), leaf blight, seedling blight. Mich., N.Y., Tex., Va., Vt., Wis.
Diplodia sp., on twigs. ?dieback. Fla.
D. thujina Pk. & G. W. Clint., on wood. N.Y.
Fomes annosus (Fr.) Cke., brown butt rot. Mich.
F. roseus (Alb. & Schw. ex Fr.) Cke., brown trunk rot. Maine.
Fusarium solani (Mart.) Appel & Wr., seedling root rot. Texas.
Hormodendrum microsporum Lagh. & Melin, blue stain of heartwood. Minn.
Hymenochaete spp., on dead branches and wood: *?H corrugata* (Fr.) Lév.—Mich.; *H. tabacina* (Sow. ex Fr.) Lév.—Mich.; *H. tenuis* Pk.—Mich., N.Y.
Hysterium thujae (Rob. ex Desm.) House, on twigs. N.Y.
Lenzites saepiaria Wulf. ex Fr., wood rot. Minn.
Lophodermium thuyae Davis, needle spot. Maine, N.H., N.Y., Wis.
Micropera tenella Sacc. & Ell., on branches. N.J.
Mycosphaerella sp., ? twig blight. Ala., Pa.
M. conigena (Pk.) House, on cones. N.Y.
M. pinsapo (Thuem.) House, on twigs. N.Y.
Mytilidion thujarum (Cke. & Pk.) Lohman, on dead bark. N.Y., Wis.
Pestalotia funerea Desm., twig blight. Maine to Miss. and Tex.
Phacidium infestans Karst., snow blight. Maine, N.Y.
Phomopsis juniperovora Hahn, nursery blight. Ind., Ky., N.J., Ohio, Pa., Va., ?Tex.
P. occulta (Sacc.) Trav., secondary twig blight. Conn., Md., Miss., N.Y., S.C.; probably general.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Physalospora obtusa (Schw.) Cke., on dead branches. Ga., Pa.
Phytophthora sp., twig blight. N.J.
Pithya cupressina (Batsch. ex Fr.) Fckl., on dead foliage. Ga., Minn., N.Y.
Polyporus spp., wood rot, usually of dead trunks and branches, sometimes on living trees: *P. adustus* Willd. ex Fr.—Minn., Pa.; *P. balsameus* Pk.—?Mich.; *P. hirsutus* Wulf. ex Fr.—Maine; *P. schweinitzii* Fr., brown root and butt rot—Northeastern States, ?Miss.; *P. versicolor* L. ex Fr.—Maine.
Poria spp., on dead wood and bark, timber rot: *P. ferruginosa* (Schrad. ex Fr.) Karst.—Mich., Wis.; *P. papyracea* (Schw.) Cke.—Maine, Mich., N.J., N.Y., Pa., Va.; *P. rufa* (Schrad. ex Fr.) Cke.—?Mich.; *P. subiculosa* (Pk.) Cke.—Mich., N.Y., Wis.; *P. versipora* Pers. ex Rom.—Minn.; *P. weirii* Murr.—Wis.
Rhizoctonia solani Kuehn, damping-off. Conn., Tex.
Schizophyllum commune Fr., wood rot. Maine.
Stamnaria thujae Seaver, on foliage. Wis.
Trametes isabellina Fr., white pocket rot. Mich.
T. serpens Amer. auths., ? Fr.: SEE *Poria papyracea.*
Valsa thujae Pk., on dead branches. N.Y.

Thuja orientalis L. (*Biota orientalis* Endl.), oriental arborvitae.

Evergreen tree of eastern Asia, cultivated in numerous horticultural forms, zones 5 and 6.

Alternaria sp., dieback, twig blight (secondary). Tex. and elsewhere. Arborvitae grown in nursery and ornamental plantings often exhibits foliage blight and dieback which have not consistently been shown due to parasitic organisms, although various fungi may be present as secondary invaders. The causes of such dieback are provisionally assumed to be physiological, such as winter injury and drought, often complicated by insect or spidermite damage.
Armillaria mellea Vahl ex Fr., root rot. Miss., Tex.
Beltrania rhombica Penz., dieback. Fla. See note under *Alternaria.*
Botrytis cinerea Pers. ex Fr., gray-mold blight. N.J.
Cercospora thujina Plakidas, twig blight, "fire." Ark., La., Tex.
Cladosporium sp., associated with dieback. See note under *Alternaria.*
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Coryneum berckmanii Milbrath, twig blight. Oregon, Wash. Chiefly on the yellow variety Berckmann.
C. cardinale Wagener, twig canker. Calif.
Didymascella thujina (Durand) Maire, leaf blight. Texas.

Diplodia sp., dieback. Ala., Fla. See note under *Alternaria*.
Hendersonia sp. (? *H. foliicola* (Berk. & Curt.) Fckl., secondary leaf blight. Tex.
Mycosphaerella sp., on twigs. La.
Pestalotia funerea Desm., dieback. Widespread.
Phomopsis juniperovora Hahn, nursery blight. Ill., Ind., Pa.
P. occulta (Sacc.) Trav., secondary leaf blight. Miss., N.J., S.C., Texas. See note under *Alternaria*.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Rhizoctonia solani Kuehn, damping-off. N.H., N.Y., Texas, Va.
Sphaeropsis sp., ?twig blight. Pa. See note under *Alternaria*.
Valsa abietis Fr., on twigs. Pa.

Thuja plicata D.Don, giant arborvitae (western redcedar).

Range 1,2,4,6,7,12; evergreen tree, important source of lumber.

Aleurodiscus amorphus (Pers. ex Fr.) Rabh., bark patch, on suppressed or injured trees. Oregon. Other species reported on dead or decaying wood include *A. amylaceus* (Bourd. & Galz.) Rogers, *A. cerussatus* (Bres.) Hoehn. & Litsch., and *A. weirii* Burt.
Armillaria mellea Vahl ex Fr., root rot, butt rot. Wash.
Chloroscypha seaveri (Rehm) Seaver, on moribund twigs. Idaho, Mont.
Coniophora puteana (Schum. ex Fr.) Karst. (*C. cerebella* Pers.), brown cubical rot. Idaho, Wash. *C. arida* (Fr.) Karst. also reported in similar connection in Idaho.
Corticium geogenium Bres. (*C. albostramineum* (Bres.) Wakef.), sapwood rot. Idaho. Numerous other species, reported on dead wood in Idaho, Mont., and Wash., include: *C. furfuraceum* Bres., *C. galactinum* (Fr.) Burt, *C. livido-caeruleum* Karst., *C. lividum* Pers., *C. sulphureum* Pers. ex Fr., and *C. vellerum* Ell. & Cragin.
Coryneum spp., twig blight. Idaho, Oregon, Wash. Species reported include *C. juniperinum* Ell. and *C. thujinum* Dearn.
Cucurbidothis conjuncta Petr., on branches. Idaho.
Didymascella thujina (Durand) Maire (*Keithia thujina* Durand), leaf blight. Mont. to Wash. and Calif.
Echinodontium tinctorium (Ell.) Ell. & Ev., brown stringy rot. Idaho.
Fomes annosus (Fr.) Cke., brown butt rot. Idaho.
F. applanatus (Pers. ex Wallr.) Gill., white mottled butt rot. Wash.
F. nigrolimitatus (Rom.) Egel., white pocket rot, chiefly of slash. Idaho.
F. pini (Brot. ex Fr.) Karst., red ring rot. Mont., Idaho, Wash.
F. pinicola (Sw. ex Fr.) Cke., brown trunk rot. Wash.
F. roseus (Alb. & Schw. ex Fr.) Cke., brown cubical rot. Oreg.
Hendersonia thyoides Cke. & Ell., twig blight (secondary). Oreg.
Herpotrichia nigra Hartig, snow blight. Idaho.
Hymenochaete spp., on dead wood and slash: *H. corrugata* (Fr.) Lév.—Mont.; *H. spreta* Pk.—Idaho, Wash.; *H. tabacina* (Sow. ex Fr.) Lév.—Idaho, Mont., Wash.
Lenzites saepiaria Wulf. ex Fr., wood rot. Wash.
Merulius serpens Tode ex Fr., wood rot. Wash.
Microthyrium thujae Dearn., on leaves. Oregon.
Mycosphaerella thujae Petr., leaf spot. Idaho; ? Calif., Mont. (as *Sphaerella canadensis* Ell. & Ev., a nomen nudum).
Peniophora spp., on dead wood and slash: *P. carnosa* Burt—Idaho, Mont., Oreg., Alaska; *P. gigantea* (Fr.) Mass.—Mont.; *P. gracillima* Ell. & Ev. ex Rogers—Idaho, Wash.; *P. greschikii* Bourd. & Galz.—Idaho; *P. velutina* (DC. ex Pers.) Cke.—Mont.
Pestalotia funerea Desm., dieback. Wash.
Pholiota aegerita (Brig.) Fr., on dead wood. Idaho.
Polyporus spp., various wood rots: *P. abietinus* Dicks. ex Fr.—Idaho, Wash.; *P. adustus* Willd. ex Fr.—Idaho; *P. anceps* Pk., red ray rot—Idaho; *P. chioneus* Fr.—Idaho, Wash.; *P. cuneatus* (Murr.) Buchanan—Idaho, Mont., Oreg., Wash.; *P. dichrous* Fr.—Idaho, Mont., Wash.; *P. elegans* Bull. ex Fr.—Idaho; *P. guttulatus* Pk. (*Ptychogaster rubescens* Boud.), goldenglow sapwood rot—Idaho; *P. hirsutus* Wulf. ex Fr.—Idaho; *P. schweinitzii* Fr., root and butt rot—Idaho, Wash.; *P. versicolor* L. ex Fr.—Idaho, Wash.; *P. sulphureus* Bull. ex Fr.—Idaho, Wash.
Poria spp., various wood rots: *P. albipellucida* Baxter—Wash.; *P. asiatica* (Pilát) Overh.—Wash.; *P. nigrescens* Bres.—Wash.; *P. subacida* (Pk.) Sacc.—Idaho, Wash.; *P. vaillanti* (Fr.) Cke.—Idaho; *P. weirii* Murr., yellow ring rot—general.
Stereum spp., various wood rots: *S. abietinum* Pers. ex Fr.—Idaho; *S. chailletti* Pers.—Idaho; *S. sanguinolentum* Alb. & Schw. ex Fr.—Mont.; *S. sulcatum* Burt.—Alaska.
Thelephora terrestris Ehr. ex Fr., on stems of seedlings. Wash.
Trametes isabellina Fr. and *T. serialis* Fr., wood rot. Idaho, Wash.
Valsa spp., on dead branches: *V. abietis* Fr.—Wash.; *V. kunzei* Fr. and *V. weiriana* Petr.—Idaho.

Thujopsis

T. dolabrata (L.f.) Sieb. & Zucc., Hiba arborvitae.

Evergreen tree of Japan, cultivated for ornament, zone 6.

Phomopsis occulta (Sacc.) Trav., twig blight (secondary), Calif.

CYATHEACEAE

Alsophila

(1) *A. australis* R.Br., Australian treefern.
(2) Other species.

Arborescent ferns of Australia, grown in conservatories or in the open in southern California.

Acrospermum candidum Setchell, on leaves. Ariz., ? Calif. (2).
Armillaria mellea Vahl ex Fr., root rot. Calif. (1).

Cyathea

(1) *C. arborea* (L.) J.E.Sm. Treefern of Caribbean region.
(2) Other species.

Griggsia cyathea F.L.Stevens & Dalby, black spot. P.R. (1).
Nectria filicina (Cke. & Harkn.) Sacc. (=*N. ochroleuca* (Schw.) Berk.?), on leafstalk. Calif. (2).
Stagonospora sp., on fading leaves. Calif. (1).

BLIGHT—systemic decline, eventually fatal, cause unknown; in addition to the preceding species the following fungi have been found associated, but none shown pathogenic: *Botrytis, Cladosporium, Diaporthe, Diplodia, Fusarium, Helminthosporium, Macrophoma.*

CYCADACEAE

Cycas

(1) *C. revoluta* Thunb., cycad, sago-palm.
(2) Other species.

Arborescent evergreens, mostly of subtropical Asia and Australia, grown for ornament in conservatories and in the open in the Far South; the palmlike leaves are also cut for florist's greens.

Alternaria sp., leaf spot (? secondary). Fla. (1).
Anabaena cycadeae Reinke, endophytic alga inhabiting coralloid roots. Ala., Fla., Ill., N.Y.; probably general in cultivation (1,2). Besides the alga, unidentified bacteria referred to *Azotobacter* (or *?Rhizobium*) sp. are present and may function, perhaps symbiotically, in nitrogen fixation. The alga is believed to be to some extent parasitic but essentially innocuous, and does not cause the production of coralloid roots.
Ascochyta cycadina Scalia, leaf spot. Mo., Tex. (1).
Azotobacter ?chroococcum Beijer., in coralloid roots. Fla. (1).
Gloeosporium sp. (*? Glomerella cingulata* (Ston.) Spauld. & Schrenk), associated with "blight." Fla., La. (1).
Nostoc commune Vauch., endophytic alga associated with coralloid roots. Ala., Fla.; probably general in cultivation. This species, alone or together with *Anabaena*, is sometimes reported but without critical identification.
Pestalotia cycadis Allesch. (*C. palmarum* Cke.?), leaf spot (? secondary). Conn., Fla. (1); C.Z. (1,2).
Phoma sp., also *P. bresadolae* Sacc., associated with "blight." Fla., Miss., Pa. (1).
Rhabdospora sp., on fading leaves. Fla. (1).

Zamia

(1) *Z. floridana* DC., coontie.
(2) Other species.

Palmlike evergreens of tropical America, grown for ornament in warm regions or in conservatories.

Anabaena cycadeae Reinke, in coralloid roots. Fla. See note under *Cycas.*
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla. (1).
Pestalotia cycadis Allesch., on old leaves. Fla., Ind. (1).
Tripospórium stelligerum Speg., on fading leaves. P.R. (2).

CYPERACEAE

Carex, sedge

(1) *C. festivella* Mockenz., ovalhead sedge.
(2) *C. filifolia* Nutt., threadleaf sedge.
(3) *C. geyeri* Boott, elk sedge.
(4) *C. nebraskensis* Dewey
(5) *C. stricta* Lam., tussock sedge.
(6) *C. crinita* Lam., fringed sedge.
(7) *C. plantaginea* Lam.
(8) Other species.

Grasslike perennial herbs occurring in numerous species throughout the Temperate and much of the Arctic Zones, often dominating large vegetation areas, as marshes, tundra, and moist or dry uplands, or dispersed in open woods: (1,2,3,4) furnish valuable forage in the western ranges; (5) much used for packing material; (6,7,8) grown for ornament; (8) furnish food for wildlife or are useful in erosion control.

Amerosporium caricum (Lib.) Sacc., on leaves. Miss. Conidial stage of *Niesslia exosporioides* (Desm.) Wint.?
Arthrinium caricicola G. Kunze ex Fr., on dead leaves. Pa. (8).
Ascochyta socialis Sacc., on leaves. N. Dak. (8).
Botrytis torta Ell. & Ev., on leaves. W. Va. (on *C. fraseri* Andr.).
Cercospora caricina Ell. & Dearn., leaf spot. Iowa, N.Y., Wis. (8).
C. caricis Dearn. & House—N.Y. (8).
C. microstigma Sacc.—N.Y. (8).
Ciboria aschersoniana (P. Henn. & Ploettn.) Whet., on seeds. Colo., N.Y. (8).
Cintractia caricis (Pers.) Magn., covered seed smut, head smut. General (*). A species complex including many minor variations, sometimes given specific rank, as *C. californica* Zundel—Calif. (on *C. multicaulis* Bailey); *C. externa* (Griff.) Clint.—Mont., N. Dak., Nebr., Wyo. (2); *C. subinclusa* (Koern.) Magn.—Maine to Wis., Nev., and Oreg. (8).
Cintractina caricetorum Speg.: SEE *Cintractia caricis.*
Cladosporium caricicola Cda. (=*C. herbarum* Lk.?), leaf mold. Cosmopolitan.
Clasterosporium caricinum Schw., leaf mold. Ill., Ind., N.Y., Ohio, Pa. (8).
Claviceps grohii Groves, ergot. Mich. (on *C. tribuloides* Wahlenb.).
C. caricina Griff.: SEE *Sclerotinia sulcata.*
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Wis. (8).
Comandra umbellata (L.) Nutt, parasitic on roots. ?Va. (8).
Cryptomela caricis (Cda.) Sacc., on seeds. Wis. (8).
Cryptosporium nubilosum Ell. & Ev.: SEE *Pseudostegia nubilosa.*
Cyphella caricina Pk., on culms and leaves. N.Y., Pa. (8).
Dothidella caricina Dearn. & House, on leaves. N.Y. (8).
Entorrhiza ?caricicola Ferd. & Winge, root gall. Minn. (8).
Epidochium sp., on culms of *C. fraseri.* W. Va. (8). Probably *Myrioconium* stage of *Sclerotinia.*
Farysia olivacea (DC.) Syd., seed smut. Calif., Pa., Wash., Wis. (on *C. rostrata* Stokes); Fla., Miss. (8).
Guignardia caricis Dearn. & House, on dead leaves. N.Y. (5).
Helicosporium phragmites Hoehn., leaf spot. Maine (8).

Hendersonia distans Brun., on leaves. Calif. (8).

Hyalodothis caricis Pat. & Har., hypertrophy of inflorescence. Alaska (on *C. limosa* L. and *C. lyngbyei* Hornem.). An invalid genus.

Hysteropezizella diminuens (Karst.) Nannf., on culms and leaves, ?blight. Mich., N.Y., Alaska (8). Reported in the supposed conidial stage, *Pseudostegia nubilosa*, as parasitic. Probably other records under *Mollisiopsis, Naevia, Phacidium, Pyrenopeziza, Stegia,* and *Trochila* belong here or in the following species.

H. leporinae Nannf.—Colo., N.Y. (8).

H. multipuncta (Pk.) Nannf.—N.Y. (8).

?H. subvelata (Rehm) Hoehn.—Vt. (8).

Leptosphaeria sp., on dead culms and leaves. Ga., Wis., Alaska (5,8).

L. folliculata Ell. & Ev. var. *oxyspora* J.J.Davis—Wis. (8).

L. vagans Karst.—Calif. (8).

Leptothyrella caricis Dearn. & Barth., on leaves. Kans. (5).

Lophodermium caricinum (Rob. ex Desm.) Duby, on culms and leaves. Colo. (3); Calif., N.J., N.Y. (8).

Marasmius caricicola Kauff., on base of culms. Mich., N. Dak. (8).

Mycosphaerella spp., on dead culms and leaves: *M. caricis* (Dearn. & House) Petr. & Syd.—N.Y. (5); *M. lineolata* (Rob. ex Desm.) Schroet.—Colo. (8); *M. recutita* (Fr.) Johans.—N.Y. (8); *M. tassiana* (de N.) Johans.—Colo. (3); Alaska (8); *M. wichuriana* (Schroet.) Johans.—Mont., Alaska (8).

Myrioconium affine (Desm.) Buchw., *M. ambiens* (Desm.) Hoehn. SEE *Sclerotinia.*

Neottiospora arenaria Syd., on dead leaves. Wis. (8). Probably *Hysteropezizella.*

Niptera melanophaea Rehm, on dead leaves. N.Y. (8).

Phaeoseptoria caricis Tehon & Daniels, on leaves. Ill. (8).

Phleospora caricis Ell. & Ev., leaf spot. Conn., Del., N.Y., Wis. (8).

Phyllachora caricis (Fr.) Sacc., on leaves. Ill., Maine (8). Identity unknown but not a *Phyllachora.*

Phyllosticta caricicola Sacc. & Scalia, leaf spot. Alaska (8). *P. caricicola* (Brun.) Allesch. has priority.

P. caricis (Fckl.) Sacc.—Calif., N.Y., Wis. (8).

Pleospora discors (Mont.) Ces. & De N., on dead leaves. Colo. (8).

Pseudostegia nubilosa (Ell. & Ev.) Bub., on leaves, ?blight. Ky., Mont., N.J., N.Y., Ohio (8). Said to be the conidial stage of *Hysteropezizella diminuens.*

Puccinia atrofusca (Dudl. & Thomp.) Holw. (II,III), *Carex-Artemisia* rust.[4] Wis. to N. Mex., Calif., and Alaska (*). O and I on *Artemisia* spp.

P. bolleyana Sacc. (II,III), *Carex*-elder rust. Maine to Fla., Tex., and Wis. (*). O and I on *Sambucus canadensis* L. and *S. pubens* Michx.

P. caricis (Schum.) Schroet. (II,III), *Ribes-Urtica* rust, gooseberry rust. Throughout temperate North America to the Arctic (*). A variable species consisting of 2 widely distributed principal varieties of cosmopolitan host range and several minor ones of limited host range and distribution: Var. *grossulariata* Arth., with O and I on numerous *Grossularia* and *Ribes* spp.; and var. *urticata* (Kern) Arth., with O and I on *Urtica* spp.; (*). Var. *caricisstrictae* (Diet.) Arth. — Conn., Del., Mass., N.Y., W. Va. (5,8). O and I unknown in nature. Var. *uniporula* (Orton) Arth. — Northeastern States to Wis. (*). O and I on *Grossularia* spp.

P. caricis-shepherdiae J. J. Davis (II,III), *Elaeagnus-Shepherdia* rust. Northeastern States to Colo. and northward, chiefly on *C. eburnea* Boott. and *C. viridula* Michx. O and I on *Elaeagnus* and *Shepherdia.*

P. extensicola Plowr. (II,III), *Carex*-Composite rust, evening primose rust, etc. A cosmopolitan species consisting of some 10 varieties differing in aecial hosts but uniform on numerous *Carex* spp. occurring throughout the U.S. and northward. The principal varieties are: *asteris* (Thuem.) Arth., with O and I on *Aster,* etc.; *erigerontis* Arth., with O and I on *Erigeron,* etc.; *solidaginis* (Schw.) Arth., with O and I on *Solidago,* etc.; *euthamii* Arth., with O and I on *Euthamia* spp.; *hieraciata* (Schw.) Arth., with O and I on *Hieracium, Senecio,* etc.; *oenotherae* (Mont.) Arth., with O and I on *Chamaenerion* and *Oenothera* spp.; *hydnoidea* (Berk. & Curt.) Arth., with O and I on *Dirca palustris* L.

P. karelica Tranz. (II,III). *Trientalis* rust. Maine to Wis. and Alaska, (on *Carex canescens* L., *C. diandra* Schk., *C. paupercula* Michx., and *C. strictior* Dewey.). I on *Trientalis americana* Pursh.

P. limosae Magn. (II,III), *Lysimachia* rust. Northeastern States to Nebr. (on *C. limosa* L., etc.). O and I on *Lysimachia.*

P. macrospora (Pk.) Arth. (II,III), *Carex-Smilax* rust. Del., N.J. (on *C. comosa* Boott. and *C. vestita* Willd.). O and I on *Smilax.*

P. microsora Koern. (II,III). Pa., Va., W. Va., Wis., also La. and Oreg. (*). O and I unknown.

P. minuta Diet. (II,III). Ala., Fla. (on *C. verrucosa* Muhl.). O and I unknown.

P. minutissima Arth. (II,III), *Decodon* rust. N.Y. to Mich. and Mo. (on *C. lasiocarpa* Ehrh.). O and I on *Decodon verticillatus* (L.) Ell.

P. molocaiensis Cummins (II,III). T.H. (8). O and I unknown.

P. puritanica Cumm. (II,III). Mass. (on *C. pennsylvanica* Lam.). Correlated in uredial stage with *P. extensicola.* O and I unknown.

Pyrenopeziza multipunctoides Dearn. & House, on dead leaves. N.Y. (8).

Ramularia canadensis Ell. & Ev., leaf spot. Wis. (8).

Schizonella melanogramma (DC.) Schroet., leaf smut. Mass. to Tenn. and Calif., more frequent in the West (*). *S. pusila,* formerly included with this, has been segregated.

S. pusila (Cke. & Pk.) Cif.—Mass. to Colo. and Wis. (on *C. pennsylvanica* Lam.).

Scirrhia lineata Dearn. & House, on leaves. N.Y. (8). Also reported as *Apiospora lineata* Dearn. & House.

Sclerotinia spp., inflorescence blight, stem rot: *S. sulcata* (Desm.) Whet. (*S. duriaeana* of Amer. auths., not (Tul.) Rehm)—Del., N.Y. (5,6,8); Oreg. (4); probably throughout northern U.S. on numerous species.

S. caricis-ampullaceae Nyberg—Wyo. (on *C. aquatilis* Wahlenb. var. *altior* (Rydb.) Fern. and *C. inflata* Huds.).

S. longisclerotialis Whet.—Maine, N.Y. (5, also *C. interior* Bailey, *C. prairea* Dewey, *C. retrorsa* Schw., and others). Buchwald has proposed new combinations for each of these species under the new genus *Myriosclerotinia.* The spermatial stage of each is a correspondingly named *Myrioconium. M. ambiens* (Desm.) Hoehn., though reported in N. America, belongs to an exclusively European species. *S. paludosa* Cash & Davidson, as described on *C. exsiccata* in Colo., is a mixture of sclerotia of *Typhula* and apothecia of *Rutstroemia,* according

[4] It is impracticable to present the details of the host relationships in the Carex rusts here; North American Flora, Seymour's Host Index, or Arthur's Manual of Rusts should be consulted for them. The geographic range of each rust fungus is stated in conformance with Arthur; host plants of those having a limited host range, as now known, are specifically mentioned but for the more cosmopolitan species these details are omitted.

to Whetzel. *S. utriculorum* Boud., reported on seeds of *C. athrostachya* in Colo., is considered by Whetzel to be identical with *S. aschersoniana* P. Henn. & Ploettn., noted in N.Y. on *C. stricta* and *C. prairea*, but it belongs in *Ciboria* rather than *Sclerotinia*.

Septoria spp., leaf spot or on fading leaves: *S. baudysiana* Sacc.—Wyo. (8); *S. caricinella* Sacc. & Roum.—Colo. (3); Wash., Wis., Wyo. (8); *S. caricicola* Sacc.—Mich., Oreg. (8); *S. caricis* Pass.— N. Dak., Wash. (8); *S. lineolata* Sacc.—Calif., Md., Oreg. (8); *S. lunelliana* Sacc.—Calif., N. Dak. (8); *S. polita* J. J. Davis—Wis. (8); *S. riparia* Pass.—Colo., Miss., Wis. (8); *S. tenuis* Dearn. & House—N.Y. (8).

Sparassis radicata Weir, associated with root decay. Mont. to Oreg. and Wash. (on *C. occidentalis* Bailey).

Sphaerulina pallens J. J. Davis, on leaves. Wis. (8).

Stagonospora spp., leaf spot or on fading leaves: *S. albescens* J. J. Davis (=*Phleospora caricis* Ell. & Ev.?)—Wis. (8); *S. caricinella* Brun.—Wis. (8).

S. heleocharidis Trail var. *caricina* Sacc. & Scalia—Alaska (8); *S. strictae* Ell. & Ev.—Kans. (5); *S. tetramera* J. J. Davis—Wis. (8).

Synchytrium caricis Tracy & Earle, on leaves. Utah (8).

Thecaphora aterrima Tul., head smut. Colo., Iowa, Kans., Wash. (8).

Uromyces minutus Diet. (II,III), rust. N.Y. to Fla., Tex., and Wis. (*). Correlated with *Puccinia caricis grossulariata;* O and I unknown.

U. perigynius Halst. (II,III). General (*). Correlated with *P. extensicola;* O and I on *Rudbeckia* and other Compositae.

U. uniporulus Kern. (II,III). Eastern U.S. (on *C. gracillima* Schw. and *C. flexuosa* Muhl.). Correlated with *P. caricis uniporula.* O and I unknown.

U. valens Kern (II,III). Ind., Wis. (8). O and I unknown.

Venturia graminicola Wint., on leaves. Ga. (8).

Volutella caricicola Miles, on leaves. Miss. (8).

Cyperus, flat-sedge

(1) *C. alternifolius* L.. umbrellaplant. Native of Africa, naturalized in the West Indies.
(2) *C. esculentus* L., yellow nutgrass, chufa. Cosmopolitan.
(3) *C. filiculmis* Vahl, slender cyperus. Eastern and Central States and southward.
(4) *C. ovularis* (Michx.) Torr., globose cyperus. Eastern and Southern States.
(5) *C. rotundus* L.. nutgrass. Southern States.
(6) *C. strigosus* L., straw-colored cyperus. Eastern and Central States and southward.
(7) Other species.

Annual or perennial grasslike herbs widely distributed in the Tropical and Temperate Zones, usually in moist or wet habitats. Only a few of the many species have any particular economic use but most of them furnish food for wildlife; a few are grown for ornament as garden aquatics or as house and conservatory plants (1) and *C. papyrus* L.; *C. tegetiformis* Roxb. is used extensively for mats and matting in China, and has been grown experimentally in the United States; some species are troublesome weeds (2,5) in lawns and cultivated ground.

Ascochyta sp., on leaves. Ga. (2).

A. teretiuscula Sacc. & Roum.—Wis. (7).

Balansia cyperacearum (Berk. & Curt.) Diehl, black band (on leaves and culms). Ala. (4); Fla., La. (6,7).

B. cyperi Edg., inflorescence deformity. La., Tex. (on *Cyperus* sp. and *C. virens* Michx.).

Cercospora caricina Ell. & Dearn., leaf spot. Wis. (3,7).

Cintractia cyperi Clint., inflorescence smut. Conn., Mass., Mich. (3); N.J. (7).

C. limitata Clint.—Fla., P.R. (7).

C. minor (Clint.) Jacks. Md. (3,7); Ala., Del., N.J., N.Y. (7); P.R. (5,7).

Cladosporium sitchense (Dearn.) Barth., culm spot. Wash. (7). A nomen nudum.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Himantia stellifera Johnston (=*Odontia sacchariicola* Burt.?), web blight, sheath rot. P.R. (7).

Hypocrella cyperacearum (Berk. & Curt.) Sacc.: SEE *Balansia cyperacearum.*

Meliola argentina Speg., black mildew. P.R., T.H. (7).

M. circinans Earle—Fla. (7).

Meloidogyne sp., root knot nematodes. Fla., N.C., T.H. (1,2,5,6,7).

Phyllachora cyperi Rehm, tar spot. S.C. (2), Fla. (5), W. Va. (6), N. Dak., Nebr., Wis., P.R. (7).

P. viequesensis Orton & Toro—Tex., P.R. (7).

Phytophthora cyperi (Miy. & Ideta) S. Ito, downy mildew. S.C., Tex. Found only on *C. tegetiformis* in test plots.

Puccinia antioquensis Mayor (II,III), rust. C.Z. (on *C. diffusus* Vahl). O and I unknown.

P. canaliculata (Schw.) Lagh. (II,III)—Mass. to Fla., Calif., and Wis. (2,3,5,6,7); also West Indies and Central America (7). O and I on *Ambrosia* and *Xanthium.*

P. cyperi Arth. (II,III)—Mass. to Fla., Tex., and N. Dak. (3,4,5,6); also to Calif., Utah, P.R. (7). O and I on *Erigeron* spp.

P. cyperi-tagetiformis (P. Henn.) Kern (II,III)—Fla., Tex., P.R. (7). O and I unknown.

P. subcoronata P. Henn. (II,III)—C.Z. (on *C. diffusus*). O and I unknown.

Rhizoctonia solani Kuehn, root and culm rot. Fla. (5).

Rotylenchus similis (Cobb) Filip., root nematode. T.H. (5).

Scirrhia ostiolata Ell. & Gall., on culms. Tex. (7).

Septoria cyperi Ell. & Ev., leaf spot. Ala. (7).

Stagonospora cyperi Ell. & Tracy, on culms. Miss. (7).

Uredo nociviola Jacks. & Holw. (II), rust. Fla (on *C. ferax* Richard).

Eleocharis, spikerush

Eleocharis spp.

Low, mostly perennial sedges of ponds, marshes, and moist ground, throughout temperate and tropical North America; useful to wildlife.

Claviceps nigricans Tul., ergot. Ind. (on *E. calva* Torr.); Mich. (on *E. rostellata* Torr.); N. Dak., S. Dak., S.C., Wis., Wyo. (on *E. palustris* (L.) R. & S.).

Entyloma parvum J. J. Davis, culm smut. Mass., Wis. (on *E. acicularis* (L.) R. & S.).

Physoderma heleocharidis (Fckl.) Schroet., brown leaf spot. N. Dak., Wash. (on *E. palustris*).

Puccinia eleocharidis Arth. (II,III), rust. Eastern and Central States and southward (*). O and I on *Eupatorium* spp.

P. liberta Kern (II,III)—Calif. (on *E. montana* (H.B.K.) R. & S. and *E. palustris*); P.R. (*). O and I unknown.

Uredo incomposita Kern (II), rust. P.R. (*).
Uromyces eleocharidis Arth. (II,III), rust. Ind. to Kans. and N. Dak. (on *E. palustris*). O and I unknown.

Eriophorum, cottongrass

Eriophorum spp.

Perennial sedges of bogs in temperate and arctic North America; sometimes grown in wild gardens.

Puccinia angustata Pk. (II,III), rust. Maine to Nebr. and Oreg. O and I on Lamiaceae. The var. *eriophori* (Thuem.) Arth. of similar range, but typically more northern, and with O and I on Compositae, is not distinguishable on its *Eriophorum* hosts.
Septoria chamissonis Sacc. & Scalia, leaf spot. Alaska.
S. eriophorella Sacc. & Scalia, and *S. eriophori* Oud., on leaves. Alaska.

Fimbristylis

Fimbristylis spp.

Mostly perennial, rushlike herbs of salt marshes and sandy beaches in the Eastern and Central States and southward; useful to wildlife.

Cintractia axicola (Berk.) Cornu, inflorescence smut. Ala., Del., Miss., Okla., Va., P.R. (on *F. autumnalis* (L.) R. & S.).
Puccinia fimbristylis Arth. (II,III), rust. Tex., P.R. O and I unknown.
P. superius Arth. (II)—P.R.
Septoria fimbristylis Ell. & Gall., leaf spot. Mo.
Stagonospora trimera (Cke.) Sacc., on culms. ?N.J.

Rynchospora, beakrush

Rynchospora spp.

Numerous, mostly perennial sedgelike plants in bogs and wet soil throughout the United States, more frequent in the East, and especially the South and tropical America; useful to wildlife.

Amerosporium macrochaeta Ell. & Ev., on leaves and culms. La. (on *R. corniculata* (Lam.) A.Gray).
Cercospora crinospora Atk., leaf spot. Ala. (on *R. glomerata* (L.) Vahl).
Cintractia affinis Pk., culm smut. N.Y. (on *R. corniculata*).
C. farlowii Clint., seed smut. Fla., Mass., N.J. (on *R. glomerata* and others).
C. leucoderma (Berk.) P.Henn., stem and inflorescence smut. C.Z., P.R. (on *R. corymbosa* (L.) Britt.); P.R. (on *R. cyperoides* Mart. and others).
C. montagnei (Tul.) Magn., seed smut. Maine to Fla., Miss., and Ind., also P.R. (on various species).
C. pachyderma H. Syd., culm smut. Fla. (on *R. corniculata*).
C. striata Clint. & Zundel, culm smut. Fla. (on *R. tracyi*).
C. taubertiana (P.Henn.) Clint., seed smut. Mass. to Fla. and Tex. (on various species).
C. utriculicola (P.Henn.) Clint., seed smut. P.R. (on *R. corymbosa*).
Guignardia rhynchosporae F.L.Stevens, on leaves. P.R.
Himantia stellifera Johnston, web blight. P.R.
Meliola circinans Earle, and *M. cyperi* Pat. (*?M. argentina* Speg.), black mildew. Fla., P.R.
Puccinia angustata Pk. var. *angustatoides* (Stone) Arth. (II,III), leaf rust. Ala., Fla., La., Mo., Tenn., Tex., and P.R. (on *R. corniculata*); also P.R. on other species. O and I unknown.
P. cladii Ell. & Tracy (II,III), rust. Va. (on *R. glomerata*). O and I unknown.
P. consobrina Arth. & Holw. (II,III), rust. P.R. (on *R. corymbosa*). O and I unknown.
Rhopographus clavisporus (Cke. & Pk.) Sacc., on culms. Ga.
Sorosporium rhynchosporae P.Henn., seed smut. Miss. (on *R. semiplumosa* A. Gray).
Testicularia cyperi Klotzsch, inflorescence smut. Fla., La., N.Y., Tex. (on *R. corniculata*); Fla. (on various species).
Uromyces rhyncosporae Ell. (II,III), leaf rust. Vt. to Mich., Fla., and La., also in the West Indies and T.H. (on various species). O and I unknown.

Scirpus, bulrush

(1) *S. americanus* Pers., chairmakers rush. Throughout the United States.
(2) *S. atrovirens* Muhl. Eastern and Southern States.
(3) *S. fluviatilis* (Torr.) A.Gray, river bulrush. Northeastern and Central States.
(4) *S. robustus* Pursh, saltmarsh bulrush, Atlantic and gulf coasts.
(5) *S. validus* Vahl (*S. lacustris* of American authors), American great bulrush. Central States
(6) *S. acutus* Muhl., tule. Range similar to the preceding but more western, reaching the Pacific coast.
(7) Other species.

Mostly tall perennial sedges, but a few dwarf and annual species, in shallow water, marshes, or bogs throughout temperate North America. Some are used commercially in manufacture of matting and baskets; many are important food plants of wildlife.

Arthrinium cuspidatum (Cke. & Harkn.) Hoehn., on culms. Calif.
Belonidium juncisedum (Karst.) Rehm (=*B. lacustre* (Fr.) Phil.?), on culms. Ga. (2); Mich., N.Y. (7).
Cercosporella scirpina J.J.Davis, on leaves. Wis. (7).
Cintractia caricis (Pers.) Magn., seed smut. Mich. (on *S. caespitosus* L.)
Clasterosporium caricinum Schw., leaf spot. Minn. (6).
Cryptosporium scirpi Pk.: See *Septoria peckii*.
Epicoccum neglectum Desm., leaf mold. Cosmopolitan (*).
Helminthosporium sp., leaf spot. Minn. (3).
Hendersonia scirpicola Cke. & Harkn., on culms. Calif.
Hypoderma scirpinum DC., on dead culms. Calif., Nebr., N. Dak., Wash. (6); Miss., N.Y. (7).
Leptosphaeria juncicola Rehm, on leaves. Alaska.
Leptostromella scirpina Pk., on leaves, ? leaf spot. Nebr. (2); N.Y. (3,7).
Meliola argentina Speg., black mildew. P.R., T.H.
Pestalotia scirpina Ell. & Mart., on culms. Fla., La., Md. (4,7).
Phaeosphaerella scirpicicola Earle, on leaf tips. Calif.
Puccinia angustata Pk. var. *typica* Arth. (II,III), rust. Throughout the U.S. east of the Rocky Mountains and on the Pacific coast (1,2,3,7). O and I on Labiatae, especially *Lycopus* and *Mentha*.
P. macclatchieana Diet. & Holw. (II,III), rust (on *S. microcarpus* Presl.). New England to Colo., Calif., and Wash. O and I unknown. The original spelling was *McClatchieana*.

P. obtecta Pk. (II,III),—Mass. to Va., Calif., and Oreg. (1,5,6,7). O and I on *Bidens* spp.
P. scirpi DC. (II,III), rust. P.R. (5). O and I on *Nymphoides grayanum* (Griseb.) Arth.
Septocylindrium scirpinum Pk., on leaves. N.Y. (7).
Septoria narvisiana Sacc., on culms. Del. (4).
S. peckii Sacc.. on leaves and leaf sheaths. N.Y. (3). Has also been placed in *Rhabdospora.*
Stagonospora scirpi Tehon, on leaves and sheaths. Ill. (2).
S. scirpina Ell. & Ev.—La. (7). A nomen nudum.
Synchytrium scirpi J.J.Davis. on leaves. Wis. (2).
Tetraploa scabra Harkn., on culms. Calif.
Uromyces americanus Speg. emend. Cumm. (II,III), rust. Ala., Del., Tex. (1); Ind., Nebr., Wis. (5); Calif. (7). O and I unknown.
U. scirpi (Cast.) Burr. (II,III), rust. Widespread (3, 4,7). Formerly reported on *S. americanus, S. californicus,* and *S. validus,* but these records should probably be assigned to *U. americanus.* O and I on Umbelliferae.
Xenogloea eriophori (Bres.) Syd., on stems. Wis. (2).

Scleria

Scleria spp., nut-rush, razor-sedge.

Perennial sedges of moist meadows or dry woodlands, chiefly in the Eastern and Southern States and in tropical America; useful to wildlife.

Meliola argentina Speg., black mildew. P.R.
Phyllachora scleriae Rehm (*Sphaerodothis scleriae* (Rehm) F.L.Stevens), tar spot. C.Z., P.R., V.I.
P. scleriicola Miles—Miss.
Puccinia scleriae (Paz.) Arth. (II,III), rust. C.Z., P.R., V.I. O and I on *Passiflora rubra* L.
P. scleriicola Arth. (II,III)—Fla., Ga., Ill., P.R. O and I unknown.
Uromyces scleriae P.Henn. (II,III), rust. P.R. O and I unknown.

CYRILLACEAE

Cliftonia

C. monophylla (Lam.) Britton, buckwheat-tree.

Small evergreen tree of swamplands in the Gulf States, sometimes grown for ornament.

Coccomyces sp., leaf spot. Ga.
Guignardia sp., on leaves. Ga.
Morenoella cliftoniae (Tracy & Earle) Th. & Syd., black spot. Miss.
Pestalotia cliftoniae Tracy & Earle, leaf spot (?secondary). Miss.

Cyrilla

C. racemiflora L., southern leatherwood.

Range 28.29,30. Shrub or small tree, sometimes grown for ornament.

Aecidium cyrillae Arth. (O,I), rust. Fla., La., Miss.
Botryosphaeria abrupta Berk. & Curt. (*?B. ribis* (Fr.) Gross. & Dug.), on twigs. N.C.
Lophodermium cyrillicola Tracy & Earle, on leaves. Ala., Miss.
Myriangium asterinosporum (Ell. & Ev.) J.H.Miller, on scale insects on branches. Ga.
Phyllosticta cyrillae Ell. & Martin, leaf spot. Fla.
Septobasidium sinuosum Couch, brown felt. Fla.

DIAPENSIACEAE

Diapensia

D. lapponica L.

Small evergreen herb of arctic regions and alpine summits in the Northeastern States, sometimes grown in rock gardens.

Mycosphaerella pachyasca (Rostr.) Vest., on leaves and stems. Maine.
Pleospora platyspora Sacc., on leaves. N.Y.

Galax

G. aphylla L.

Evergreen herb of dry wooded highlands from Pennsylvania to Georgia; extensively gathered for florists' greens, and grown for ground cover and in rock gardens.

Clypeolella leemingii (Ell. & Ev.) Theiss., black leaf spot. Md. to Ga. and Miss. The conidial stage, *Glenospora melioloides* Curt., has also been reported on *Galax* in markets in N.Y., Ohio, and elsewhere.
Discohainesia oenotherae (Cke. & Ell.) Nannf. (*Sclerotiopsis concava* (Desm.) Shear & B.O.Dodge), leaf spot. N.C.
Laestadia galactina Dearn. & House. on old leaves. N.C. Probably also this reported as *Sphaerella* sp. in Va., and preferably referred to *Mycosphaerella.*
Phyllosticta galactis (Cke.) Ell. & Ev., leaf spot. N.C., Va., and W. Va. Published as *P. galactis* but based on *Phoma galacis* Cke. *Phoma galactis* Dearn. & House, on stems, in N.C., is probably a synonym.
Sporonema oxyocci Shear, on flowers and capsules. Tenn.

Shortia

S. galacifolia Torr. & Gray, Oconee-bells.

Evergreen herb of highlands in North Carolina and South Carolina; sometimes grown in rock gardens.

Discohainesia oenotherae (Cke. & Ell.) Nannf., leaf spot. N.C., S.C.

DICKSONIACEAE

Cibotium

Cibotium spp.

Treeferns of Mexico, Central America, and Polynesia, often grown in conservatories.

Bagnisiopsis polymorpha (Lyon ex F.L.Stevens) Petr. (*Yoshinagella polymorpha* Lyon ex F.L.Stevens), black spot, scab. A var. *pauciseta* F.L.Stevens, and *B. nuda* (F.L.Stevens) Petr. are also reported but are doubtfully distinct.

Helminthosporium cibotii F.L.Stevens & Weedon, leaf spot. T.H.
Pestalotia cibotii R.P.White, leaf spot. N.J.
Pezizella chrysostigma (Fr.) Sacc., on leafstalks. T.H.
Sphaerulina cibotii F.L.Stevens & Guba, on leaves. T.H.
Trichothallus hawaiiensis F.L.Stevens, on dead leaves. T.H.

DIOSCOREACEAE

Dioscorea, yam

(1) *D. alata* L.
(2) *D. batatas* Decne., Chinese yam, cinnamon-vine.
(3) *D. villosa* L., wild yam.
(4) Other species.

Tuberous-rooted, herbaceous or woody vines, frequent in the Tropics; (2) cultivated and (3) endemic also in the Southern and Eastern States. Grown for edible roots (1,2, and others) or for ornament (2); useful to wildlife.

Cercospora carbonacea Miles, leaf spot. P.R. (1,4).
C. dioscoreae Ell. & Martin. Ill., Iowa, Md., Mich., Pa., Wis. (3).
Colletotrichum sp. (*?C. gloeosporioides* Penz.), anthracnose. P.R. (4).
C. dioscoreae Tehon, leaf spot. Ill. (3).
Didymaria fulva Ell. & Ev., on leaves. Ind. (3).
Didymella dioscoreae (Berk. & Curt.) Sacc., on stems. Fla., S.C. (4).
Diplodia theobromae (Pat.) Nowell, root rot. C.Z. (1).
Fusarium sp., wilt. P.R. (4).
Goplana dioscoreae (Berk. & Br.) Cumm. (II,III), rust. Guam (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. N.C. (4).
Phoma dioscoreae Fairm., on stems. N.Y. (2).
Phyllachora ulei Wint., black leaf spot. C.Z., P.R. (4).
Phyllosticta dioscoreae Cke., leaf spot. S.C., Va., W. Va. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pratylenchus pratensis (De Man) Filip., root nematode. P.R.
Ramularia dioscoreae Ell. & Ev., leaf spot. Wis.
Rotylenchus bradys (Steiner & LeHew) Filip., nematode. P.R. (1,2,4).
Sphenospora pallida (Wint.) Diet. (II), rust. C.Z. (4).
Uredo dioscoreicola Kern, Cif., & Thurston (II), rust. P.R. (4).

MOSAIC—unidentified virus. P.R.

Rajania

R. cordata L., cockscomb-yam.

Perennial vine of the West Indies, grown for ornament.

Phyllachora ulei Wint., black leaf spot. P.R.
Uredo dioscoreicola Kern, Cif., & Thurston (II), rust. P.R.

DIPSACEAE

Dipsacus, teasel

(1) *D. fullonum* L., fullers teasel.
(2) *D. sylvestris* Mill., common teasel.

Biennial herbs of Europe, grown for burs for fulling wool (1) or for ornament (2); naturalized in the Eastern States and Pacific Northwest.

Cercospora elongata Pk., leaf spot. Md. (1); N.Y. to Tex. and Ill.; Wash. (2).
Ditylenchus dipsaci (Kuehn) Filip., stem and leaf nematode. Calif., Oreg. (1).
Mycosphaerella asterinoides (Ell. & Ev.) Fairm., on stems. N. Y. (2).
Peronospora dipsaci Tul., downy mildew. Mo. (2).
Phoma oleracea Sacc. var. *dipsaci* Sacc., on stems. Tex. (2).
?Phyllactinia corylea Pers. ex Karst., powdery mildew. Wash. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Tex. (2).
Sclerotium rolfsii Sacc., southern blight. Tex. (2).

Scabiosa

(1) *S. atropurpurea* L., sweet scabious.
(2) Other species.

Annual or perennial herbs of Europe or Asia, especially (1) grown as a garden flower.

Erysiphe polygoni DC., powdery mildew.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. N.Y. (2).
Sclerotium rolfsii Sacc., southern blight. Fla. (1).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Conn., N.J., N.Y., Va. Also var. *californicus* Holmes in Calif. (1).

EBENACEAE

Diospyros, persimmon

(1) *D. virginiana* L., common persimmon. Range 20,22,25,27,28,29,30,31.
(2) *D. texana* Scheele, Texas, or black persimmon. Range 11,16,17,20,29,30.

Forest trees producing edible fruit and wood of commercial value; useful in soil erosion control and important food plant of wildlife.

(3) *D. kaki* L. f., Japanese persimmon.

Small tree of Japan and China, cultivated commercially for fruit chiefly in California and the Gulf States.

(4) Other species.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Fla. (1); Calif. (3,4).
Alternaria sp. (*?A. tenuis* Nees ex Cda.), fruit spot and rot. Ohio (2); Secondary leaf spot.—Fla. (2).

Armillaria mellea Vahl ex Fr., root rot. Calif. (2).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., branch canker, dieback. Ala. (1,2); La., Md. (1).
Botrytis cinerea Pers. ex Fr., gray-mold rot. Calif.; also in markets (2).
Cephaleuros virescens Kunze, green scurf. Fla. (2).
Cephalosporium diospyri Crandall, wilt. N.C. and Tenn. to Fla. and Tex. (1); also experimentally (2).
Ceratostomella (*?Endoconidiophora*) sp., blue stain of timber. Ill. (1).
Cercospora diospyri Thuem. (*C. flexuosa* Tracy & Earle), brown leaf spot. Ill., Md., Miss., S.C., Tex., Va. (1).
C. fuliginosa Ell. & Kell. (*C. atra* Ell. & Ev.), black leaf spot. Ala., Fla., Ga., Ill., Miss., Tex. (1,2).
C. kaki Ell. & Ev.—Ala., Fla., Ga., La., Miss., Tex. (2); ? Oreg. (2). Said to be the conidial stage of *Mycosphaerella diospyri* Syd. but unconfirmed; perhaps a synonym of *C. fuliginosa*.
Daedalea ambigua Berk., wood rot. La., Miss. (1).
Daldinia concentrica (Bolt. ex Fr.) Ces. & deN., wood rot. La., Va. (1).
D. vernicosa (Schw.) Ces. & de N.—Va. (1).
Diplodia sp. (*D. natalensis* P.Evans). SEE *Physalospora*.
Dothiorella diospyri Petr. & Syd.: SEE *Botryosphaeria*.
Fomes spp., heart rot of dead or sometimes living trunks: *F. annosus* (Fr.) Cke.—Ind. (1); *F. australis* Cke.—La., Miss. (1); *F. geotropus* Cke.—La., Miss. (1); *F. marmoratus* (Berk. & Curt.) Cke.—Ark., La., Miss. (1).
Fusicladium levieri Magn., leaf spot. Conn., Fla., Miss. (1). Also reported as *Cladosporium* and *?Clasterosporium*.
Ganoderma lucidum (Leyss. ex Fr.) Karst., butt rot. La. (1).
Gloeosporium diospyri Ell. & Ev. (=*Glomerella cingulata* (Ston.) Spauld. & Schrenk ?), anthracnose of leaves and fruit, twig blight. Ala., Fla., Kans., La., Miss., Tex., W. Va. (1); Fla., Miss. (2).
Hericium erinaceus (Bull. ex Fr.) Pers., wood rot. La. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Isariopsis linderae (Ell. & Ev.) Sacc., on leaves. W. Va. (1).
Lasiosphaeria pezicula (Berk. & Curt.) Sacc., gray stain of logs and timber. Ill. (1).
Lentinus tigrinus Fr., sapwood rot, wound rot. La., Miss. (1).
Leptothyrium pomi (Mont. & Fr.) Sacc., flyspeck on fruit. Fla. (2).
Macrophoma diospyri Earle, fruit spot, twig blight. Ala., N.C., Tex. (1). SEE ALSO *Physalospora*.
Meloidogyne sp., root knot nematodes. Fla., S.C., Tex. (1,2).
Myriangium duriaei Mont. & Berk., on twigs (parasitic on scale insects). Ala., Fla. (1).
Pellicularia koleroga Cke., thread blight. Fla. (2).
Penicillium expansum Lk. ex Thom, blue mold. Occasional in markets (2).
Pestalotia ?guepini Desm., secondary leaf spot. Ala., Fla., Kans., S.C. (1,2).
Phoma diospyri Sacc., on twigs, ?dieback. Fla., (1,2), S.C. (1). Said to be the conidial stage of *Diaporthe diospyri* Sacc. & Migl.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla., Tex. (1).
Phyllachora orbiculata (Schw.) Sacc., black spot. S.C., Tenn. (1). Not a *Phyllachora* but not otherwise identified as yet.
Phyllosticta sp., leaf spot. Fla., Ind. (1).
P. biformis Heald & Wolf—Tex. (1,3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz. (2), Tex. (1,2).
Physalospora spp., black rot of fruit, twig blight: *P. abdita* (Berk. & Curt.) N.E.Stevens (*P. fusca* N.E.Stevens)—Ala., Ga. (1); *P. obtusa* (Schw.) Cke.—Ala., N.Y., Tex. (1); *P. rhodina* (Berk. & Curt.) Cke.—Ala., Tex. (1).
Pleurotus ostreatus Jacq. ex Fr., sapwood rot. La., Miss. (1).
Podosphaera oxyacanthae (DC.) d By., powdery mildew. Tex. (1).
Polyporus spp., wood rot, usually on dead trunks and branches, sometimes on living trees: *P. fissilis* Berk. & Curt.—La. (1); *P. gilvus* (Schw.) Fr.—Ark., La., Miss. (1); *P. mutabilis* Berk. & Curt.—Ark., La. (1); *P. pargamenus* Fr.—Miss. (1); *P. spraguei* Berk. & Curt., butt rot—Ind. (1); *P. supinus* Sw. ex Fr.—La., Miss. (1); *P. versicolor* L. ex Fr.—Va. (1).
Poria cocos Wolf, on roots, tuckahoe. Fla. (1).
Ramularia sp., leaf spot. Fla. (1).
Rhizopus stolonifer (Ehr. ex Fr.) Lind, soft rot of fruit. Tex. (2); also in markets.
Schizophyllum commune Fr., sapwood rot. Ky., Tenn. (1).
Sphaeropsis diospyri Dearn. & Barth. (=*Physalospora obtusa* ?). La. (1).
Thyronectria pyrrochlora (Auers.) Sacc., on dead twigs. Ga. (1).
Tryblidiella rufula (Spreng. ex Fr.) Sacc., on dead branches. Ala., Ga. (1); Fla. (2).
Valsa diospyri Ell. & Ev., on dead twigs. W. Va. (1).
Valsaria diospyri (Schw.) de N., on dead twigs. S.C. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Tex. (2).

ELAEAGNACEAE

Elaeagnus

(1) *E. angustifolia* L., Russian-olive.
(2) *E. commutata* Bernh. (*E. argentea* Pursh), silverberry.
(3) Other species.

Small trees or shrubs: (1) of Europe and southwestern Asia, locally naturalized in the Central and Northern Plains States, (2) native; cultivated for ornament and hedges, zone 2; useful to wildlife.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Ga. (1).
A. rhizogenes (Riker et al.) Conn, hairy root. Iowa.
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches. ? canker. Ga. (3).
Camarosporium elaeagnellum Fairm., on dead branches. Calif., N. Dak. (1); N.Y. (3).
Cercospora carrii Barth., leaf spot. Tex. (1).
C. elaeagni Heald & Wolf—Miss., Okla., Tex. (1); Fla. (3).
Cucurbitaria caraganae Karst. var. *elaeagni* Rehm (= *C. elongata* (Fr.) Grev. ?), on dead branches. N. Dak. (1,2).
Cytospora elaeagni Allesch., on dead twigs. Okla. (1). SEE ALSO *Valsa*.
Diaporthe elaeagni Rehm (=*D. beckhausii* Nits.?), on dead branches. N.Y. (2).
Fusarium sp., secondary (?) in trunk canker. Wyo. (1). SEE ALSO *Phytophthora*.

Hendersonia sp., associated with twig canker and dieback. Wash. (1).
Mycosphaerella sp., on leaves. Ga. (1).
Nectria cinnabarina Tode ex Fr., on twigs, ?dieback. Calif., Iowa (1); Tex. (3).
Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla. (3).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Oreg. (2).
P. elaeagni Linder—Wyo. (2).
Phyllosticta argyrea Speg., leaf spot. N.C. (1), Md. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Okla., Tex. (1, resistant), (3).
Physalospora obtusa (Schw.) Cke., on branches. Ala. (3).
Phytophthora sp., foot rot, gummosis. Ariz. (1).
P. cactorum (Leb. & Cohn) Schroet., trunk canker. Ill., ?Mont., Wyo. (1).
Puccinia caricis-shepherdiae J.J.Davis (O,I), rust. N. Dak. (1); Colo., Mont., Nebr., N. Dak., S. Dak., Wyo. (2).
P. coronata Cda. var. *elaeagni* Fraser & Ledingham (I), Mont., N. Dak. (2). II and III on *Calamagrostis elongata.*
?Rhizobium sp., root nodules. Wash. (1).
Rhizoctonia ramicola D.A.Roberts, thread blight. Fla. (3).
Sclerotium rolfsii Sacc., seedling blight. Tex. (1).
Septoria argyraea Sacc., leaf spot. Iowa, N. Dak., Wis. (1); Nebr. (2).
S. elaeagni (Chev.) Desm.—Kans. (1).
Sphaeropsis elaeagnina Fairm., on dead branches. N. Dak. (1).
Tryblidiella rufula (Spreng. ex Fr.) Sacc., on dead branches. Fla. (3).
Valsa ambiens Pers. ex Fr., on dead twigs. N. Dak. (1).
Verticillium sp., wilt. Wash. (1).

BUD ABORTION—cause unknown. Idaho, Oreg., Wash. (1).

Shepherdia, buffaloberry

(1) *S. argentea* (Pursh) Nutt., silver buffaloberry. Range 4,9,11,12,13,15,16,18,19,21, 22,23.
(2) *S. canadensis* (L.) Nutt., russet buffaloberry. Range 2,12,13,14,15,18,21,23,24,26, 27.

Deciduous shrub bearing edible fruit, sometimes grown in hedges; useful to wildlife.

Clasterosporium dothideoides Ell. & Ev., on dead twigs. Mont. (1).
Cucurbitaria shepherdiae Ell. & Ev., on dead twigs. Mont. (1).
C. occulta Oud.—N. Dak. (1).
Fomes fraxinophilus (Pk.) Sacc. f. *ellisianus* (F.W. Anderson) Baxter, white heart rot. Colo., Mont., S. Dak., Wyo. (1); N. Mex. (3).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Utah (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Pleospora shepherdiae Pk., on dead twigs. N. Dak., Utah (1); N.Y. (2).
Puccinia caricis-shepherdiae J.J.Davis (O,I), rust. Northern Rocky Mountain States (1,2); Mich., N. Mex., N.Y., Oreg., Wash., Alaska (2). II and III on *Carex* sp. *P. coronata* Cda. (O,I)—S. Dak. to N. Mex., Wash., and Alaska (2); previous reports on (1) are now referred to the preceding species. II and III probably on wild grasses.
Pythium ultimum Trow, damping-off. Nebr. (1).
Rhizoctonia solani Kuehn, damping-off. Nebr. (1).
Septoria shepherdiae (Sacc.) Dearn., leaf spot. Utah, Wis. (1); Idaho, Mont., Wis., Alaska (2).
Sphaerotheca humilis (DC.) Burr., powdery mildew. Colo., Mont. (1). Also var. *fuliginea* (Schlecht.) Salm.—Mont., Wyo. (1,2); Tex., Alaska (2).
Valsa ambiens Pers. ex Fr., on dead twigs. Colo., N. Dak., Wash. (1).

EMPETRACEAE

Empetrum

E. nigrum L., crowberry.

Low evergreen shrub of boreal and alpine regions, sometimes grown in rock gardens; useful to wildlife.

Chrysomyxa empetri (Pers.) Schroet. (II,III), rust. Maine, N.H., N.Y. O and I on *Picea glauca* in Europe.
Didymosphaeria empetri (Fr.) Sacc., on leaves. Alaska.
Physalospora empetri Rostr., on leaves. Alaska.
Septoria empetri Rostr., on leaves. Alaska.

EQUISETACEAE

Equisetum, horsetail, scouring-rush

(1) *E. arvense* L.
(2) *E. hiemale* L.
(3) *E. laevigatum* A. Br.
(4) Other species.

Rushlike herbs of waste ground: (1) mostly northern, (2) cosmopolitan, and (3) eastern; sometimes weeds in cultivated fields; useful to wildlife.

Gloeosporium equiseti Ell. & Ev., blight. Vt. to Ind., Colo., and Wash. (*). Generally considered the conidial stage of *Stamnaria americana* Mass. & Morg., not confirmed by cultures. Identification as *Gloeosporium* untenable because of septate spores but not otherwise satisfactorily named; considered by some a synonym of the European *Phleospora equiseti* (Desm.) Hoehn. (*Titaeospora detospora* (Sacc.) Bub.); this cannot be maintained if *S. americana* is its ascigerous stage and is distinct from the European *S. persoonii.* Also reported as *Cylindrosporium, Septoria, Septogloeum, Stagonospora,* and perhaps *Ramularia equiseti.*
Leptosphaeria arvensis Sacc. & Speg., on stems. Calif. (1).
L. equiseti Karst.—N.Y. (2).
Mycosphaerella altera (Pass.) House, on stems. N.Y. (2).
Phialea rhodoleuca (Fr.) Sacc., on stems. Colo. (4).
Rhizoctonia solani Kuehn, root and stem rot. Ill., Minn., Tex. (1,2).
Stamnaria americana Mass. & Morg., on dead stems. Northeastern, North Central, and Pacific Coast States (*). Reports of European *S. persoonii* (Moug. ex Fr.) Fckl. (*S. equiseti* (Hoffm. ex Fr.) Karst.) in Ind., Mich., N.Y., and Ohio, and perhaps Calif., Oreg., and Wash., probably belong here.
Ramularia equiseti C. Massal., on stems. Wis. (3). SEE ALSO *Gloeosporium.*

ERICACEAE

Andromeda, bog-rosemary

(1) *A. glaucophylla* Link
(2) *A. polifolia* L.

Low evergreen shrubs mostly in the Northeastern and North Central States (1), or Arctic North America (2); sometimes grown in rock or bog gardens; useful to wildlife. The horticultural plants formerly referred to *Andromeda* are placed mainly under *Lyonia* and *Pieris*.

Asterina clavuligera Cke., black mildew. Ga., N.J. (1).
Chrysomyxa cassandrae (Pk. & G.W.Clint.) Tranz. (II, III), rust. O and I (*Peridermium consimile* Arth. & Kern) on *Picea* spp.
Exobasidium vaccinii Wor. (*E. andromedae* Pk.), leaf gall. Maine, N.Y., Wis. (1); N.Y., Alaska (2).
Microsphaera alni DC. ex Wint. var. *vaccinii* (Schw.) Salm., powdery mildew. Mass., N.J. (1).
Rhytisma andromedae Pers. ex Fr., tar spot. Maine to N.C., Ind., Minn. (1); Mich., N.Y., Alaska (2).
Venturia arctostaphyli Cke. & Harkn. (*V. cassandrae* Pk.), leaf spot or superficial on leaves. N.Y. (2).

Arbutus

(1) *A. menziesii* Pursh, madrone. Range 1,2, 3,5,10.

Evergreen tree, often planted for ornament, zone 7; wood used commercially; locally important as a honey plant; useful to wildlife.

(2) *A. unedo* L., strawberry-tree.

Small evergreen tree of southern Europe, cultivated for ornament, zone 7.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Calif. (2).
Ascochyta hanseni Ell. & Ev., leaf spot. Calif., Tex. (1).
Coccomyces sp. (*C. quadratus* (Schm. ex Fr.) Karst.), on dead leaves. Calif., Wash. (1).
Coniothyrium asterinum (Cke. & Harkn.) Tassi, on leaves. Calif. (1).
Cryptosporium punctiforme Cke. & Harkn., on leaves. Calif. (1).
Cryptostictis arbuti (Bonar) Zeller, leaf spot, blight. Calif., Oreg. (1).
Dendrophoma rhododendri (Roum.) Sacc., on branches. Calif., Wash. (1).
Diatrypella prominens (Howe) Sacc., on branches. Calif. (1).
Didymosporium arbuticola Zeller, leaf spot. Oreg. (1).
Diplodia maculata Cke. & Harkn., on leaves. Calif., Tex. (1).
Discosia minima Berk. & Curt., on leaves. Calif. (1).
Elsinoë mattirolianum Arnaud & Bitanc., spot anthracnose. Calif. (1,2).
Exobasidium vaccinii Wor., red leaf spot, gall. Calif., Oreg., Tex., Wash. (1).
Fomes subroseus (Weir) Overh., heart rot. Oreg. (1).
Harknessia arctostaphyli Cke. & Harkn., on fallen leaves. Calif. (1).
Homostegia rugodisca (Cke. & Harkn.) Sacc., on leaves. Calif. (1).
Lenzites saepiaria Wulf. ex Fr., wood rot. Oreg. (1).
Macrophoma maculiformis (Cke. & Harkn.) Sacc., on leaves. Calif. (1).
Melanconis californica (Ell. & Harkn.) Wehm., on branches. Calif. (1).
Mycosphaerella arbuticola (Pk.) House, leaf spot. Calif., Oreg., Wash. (1).
Phacidium arbuti Cke. & Harkn., on leaves. Calif. (1).
Phyllosticta fimbriata Ell. & Ev., leaf spot. Calif. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Phytophthora cactorum (Leb. & Cohn) Schroet., trunk canker. Calif., Wash. (1).
Polyporus dichrous Fr., wood rot. Oreg. (1).
P. versicolor L. ex Fr.—Tex. (5).
Pucciniastrum sparsum (Wint.) Fisch. (II,III), rust. Calif., Oreg., Wash. (1). O and I on *Picea excelsa* in Europe.
Rhytisma arbuti Phill. (*Melasmia arbuticola* Vize), tar spot. Calif., Oreg., Tex., Wash. (1).
Septoria unedonis Rob. & Desm., leaf spot. Oreg. (2).
Sphaceloma mattiroliana (Sacc. & D. Sacc.) Jenkins: SEE *Elsinoë mattirolianum*.
Trametes sepium Berk., wood rot. Calif. (1).
Valsa delicatula Cke. & Ell., on dead branches. Oreg., Wash. (1).

Arctostaphylos, manzanita

(1) *A. manzanita* Parry, Parry manzanita.
(2) *A. patula* Greene, greenleaf manzanita.
(3) *A. pungens* H.B.K., pointleaf manzanita.
(4) *A. uva-ursi* (L.) Spreng., bearberry.
(5) Other species.

Evergreen shrubs, thicket forming (1,2,3) or trailing (4); mostly in the Pacific Coast and Southwestern States, (4) also throughout the Rocky Mountains and uplands in the East; wildlife-food plants and useful in erosion control; (1) is a locally important honey plant.

Asterina conglobata Berk. & Curt., on leaves. Maine (4).
A. gaultheriae Curtis ex Ell. & Ev., black leaf speck. Wis. (4).
Cercospora gaultheriae Ell. & Ev., leaf spot. Wis. (4).
Chrysomyxa arctostaphyli Diet. (III), rust. Colo., Mont., Utah, Wis., Alaska (4).
Coniothyrium arctostaphyli (Vize) Tassi, on leaves. Calif. (3); Oreg. (4).
Cryptosporium falcatum Cke. & Harkn., on leaves. Calif. (3,5), Wash. (4).
Cryptostictis arbuti (Bonar) Zeller, leaf spot. Oreg. (5).
Exobasidium vaccinii Wor., red leaf spot, gall. Widespread, probably general (*); specific reports from Calif., Oreg., and Wash. (1,2,3,5); also Colo., Idaho, Mont., and Mass., N.J., N.Y., Vt., Wis. (4). Reports of *E. oxycocci* Rostr. and *E. uvi-ursae* (Maire) Juel included.
E. vaccinii-uliginosi Boud., shoot gall. Calif. (2); Oreg. (5).
Fomes arctostaphyli Long, heart rot. Oreg. (2,5). Probably this also reported as *F. igniarius* (L. ex Fr.) Kickx—general in range of these hosts.
Harknessia arctostaphyli Cke. & Harkn., on dead leaves. Calif. (3,5).
Lophodermium maculare (Fr.) de N., on leaves. Oreg. (5).
Meliola sp. (*Asteridium bicolor* Ell. & Ev.), black mildew. Calif. (5).
Phacidium vaccinii Fr., on fallen leaves. Idaho, Maine, Mont., Wash. (4).
Phoradendron villosum Nutt., mistletoe. Calif., Oreg. (1,2).
Phyllosticta amicta Ell. & Ev., leaf spot. Calif. (1); Oreg., Wash. (5).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,5).

Poria ferruginosa (Schrad. ex Fr.) Cke., white spongy rot. Calif. (5).
Pucciniastrum sparsum (Wint.) Fisch. (II,III), rust. Calif., Oreg. (1,2,5); ?Wis. (4).
Sporodesmium induratum Cke., on leaves. Calif. (5).
Venturia arctostaphyli Cke. & Harkn., on leaves. Calif. (4,5); Mass. (4).

Arctous

E. alpinus (L.) Niedenzu, black-bearberry.

Low shrub of alpine areas in the Northeast and to Alaska, sometimes grown for ground cover.

Pucciniastrum sparsum (Wint.) Fisch. (II,III), rust. Alaska.

Cassiope

(1) *C. hypnoides* (L.) D.Don
(2) *C. mertensiana* (Bong.) G.Don
(3) Other species.

Low evergreen shrubs of arctic North America to New England and Oregon; used in rock gardens; useful to wildlife.

Antennaria rectangularis Sacc. (*?Antennularia* sp.), on foliage. Alaska (1). An invalid name as applied to a fungus.
Diplodina rostrupii Vest., on stems. Alaska (1).
Exobasidium vaccinii Wor., leaf gall. Wash., Alaska. (2).
Lophodermium orbiculare Ehr. ex Sacc., on leaves. Alaska (3).
Phaeospora cassiopes Dearn. & House, on leaves. Calif. (2).

Chamaedaphne

C. calyculata (L.) Moench, cassandra, leatherleaf. Range 21,22,23,24,26.27,28.

Evergreen shrub, cultivated for ornament, zone 2.

Ascochyta cassandrae Pk., leaf spot. Mich., N.Y., Wis.
Cenangium cassandrae Pk. and *C. pezizoides* Pk., on dead stems. N.Y.
Chrysomyxa cassandrae (Pk. & G.W.Clint.) Tranz. (II,III), rust. Maine to Pa. and Minn.; Alaska. O and I on *Picea* spp.
Cucurbitaria cassandrae Ell. & Ev., on dead stems. Mich., N.Y. A nomen nudum.
Discella arida Pk., on dead leaves. N.Y.
Dothichiza cassandrae Ell. & Ev., on dead stems. Mich.
Exobasidium vaccinii Wor. (*E. cassandrae* Pk.), leaf gall. N.H. to Pa. and Wis.
Godronia cassandrae Pk. (*Fusicoccum putrefaciens* Shear), on dead stems. N.J., N.Y.
Hypoderma cassandrae Ell. & Ev., on dead stems. Mich.
Lophodermium maculare (Fr.) de N. and *L. orbiculare* Ehr. ex Sacc., on leaves. N.H., N.Y.
Phialea cassandrae Kanouse, on dead leaves. Mich.
Physalospora obtusa (Schw.) Cke., on twigs. ?N.Y.
Synchytrium vaccinii Thomas, red leaf gall. N.J.
Venturia arctostaphyli Cke. & Harkn. (*V. cassandrae* Pk.), leaf spot. Maine, N.H., N.Y.
V. pulchella Cke. & Pk., on leaves. Maine, Mich., N.H., N.J., N.Y., Wis. These 2 species have been confused in reports and may not be distinct; *V. pulchella* is the earlier name.

Chiogenes

C. hispidula (L.) Torr. & Gray, creeping snowberry.

Evergreen herb of the Far North, used in rock gardens.

Chrysomyxa chiogenis Diet. (II,III), rust. Mich., N.H., N.Y., Wis. O and I unknown.

Epigaea

E. repens L., trailing-arbutus.

Evergreen herb of the Far North and uplands in the East, collected for fragrant bloom and grown in wild gardens.

Cercospora epigaeae Ell. & Dearn., leaf spot. N.Y., N.C., Wis.
Discosia maculicola Gerard, on old leaves. Md., W. Va.
Microsphaera alni DC. ex Wint. var. *vaccinii* (Schw.) Salm., powdery mildew. Conn. to Va. and Wis.
Phyllosticta epigaeae Pk., leaf spot. Mass., N.Y.

Erica, heath

Erica spp.

Numerous small evergreen shrubs of western Europe, the Mediterranean region, and South Africa, cultivated for ornament; a few hardy in zone 3, mostly in 5 and 7, especially California.

Ascochyta sp., stem rot. N.J.
Erysiphe polygoni DC., powdery mildew. Calif.
Phytophthora cinnamomi Rands, collar rot. Calif., N.Y.
Pucciniastrum ericae (Naumann) Cumm. (II), rust. Calif.

Gaultheria

(1) *G. procumbens* L., checkerberry, teaberry. Range 21,22,23,24,25,26,27,28,29.

Creeping evergreen herb, source of natural oil of wintergreen; cultivated in wild gardens; useful to wildlife.

(2) *G. shallon* Pursh, shallon, salal. Range 1,2,4,12.

Evergreen shrub bearing edible fruit; sometimes grown for ornament; useful to wildlife.

(3) Other species.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on stems. Mass. (1).
Cercospora gaultheriae Ell. & Ev., leaf spot. N.J., Wis. (1).
Discohainesia oenotherae (Cke. & Ell.) Nannf., leaf spot (? secondary). Va. (1).
Discosia maculicola Gerard, leaf spot (secondary). N.J. (1).
?Gloeodes pomigena (Schw.) Colby, sooty blotch. Wis. (1).
Elsinoë ledi (Pk.) Zeller, spot anthracnose. Oreg., Wash. (2).
Lachnum gaultheriae (Ell. & Ev.) Zeller, leaf spot. Calif., Oreg., Wash. (2).
Leptosphaeria gaultheriae Dearn., on dead stems. Oreg. (2).
?Leptothyrium pomi (Mont. & Fr.) Sacc., black speck. Wis. (1).
Lophodermium exaridum (Cke. & Pk.) Sacc., on dead leaves. Calif. (2).

Meliola sp. (*?M. niessleana* Wint.), black mildew. Calif. (2); Colo. (3).
Microsphaera alni DC. ex Wint., powdery mildew. Md. (1); Oreg. (2).
Mycosphaerella gaultheriae (Cke. & Ell.) House, leaf spot. Maine to Md. and W. Va. (1); Pacific Coast States and Alaska (2).
Pestalopezia brunneo-pruinosa (Zeller) Seaver (*Pestalotia gibbosa* Harkn.), leaf spot. Calif., Oreg., Wash. (2).
Phacidium gaultheriae Dearn., on stems. Calif., Oreg., Wash. (2).
Phyllosticta gaultheriae Ell. & Ev., leaf spot. General (1,2). Probably the conidial stage of *Mycosphaerella gaultheriae.*
Schizothyrium gaultheriae (Curt. ex Ell. & Ev.) Hoehn., black speck. Maine to Va. and Wis. (1).
Venturia arctostaphyli Cke. & Harkn. (*V. gaultheriae* Ell. & Ev.), leaf spot. Mass., Md., N.J., N.Y., Va.

Gaylussacia, huckleberry

(1) *G. baccata* (Wangh.) K.Koch, black huckleberry. Range 22,23,24,25,26,27,28,29.
(2) *G. brachycera* (Michx.) A.Gray, box huckleberry. Range 29,30.
(3) *G. frondosa* (L.) Torr. & Gray, dangleberry. Range 25,27,28,29.
(4) Other species.

Small deciduous (1,3) or evergreen (2) shrubs bearing edible fruit, rarely cultivated but sometimes planted for ornament or ground cover; useful to wildlife.

Ceuthospora lunata Shear, on leaves. Md. (2).
Cuscuta sp., dodder. Pa. (1).
Dimerosporium ellisii Sacc., black mildew. N.J. (1,3); Miss. (4). A name of doubtful standing but no satisfactory alternative.
Discohainesia oenotherae (Cke. & Ell.) Nannf., on leaves. Va. (1).
Exobasidium vaccinii Wor., leaf gall. Maine to Va. and Wis. (1); Ala., Fla., Mass., Md., Mich., N.Y. (3).
Guignardia vaccinii Shear, on leaves. Md. (2).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Okla. (4).
Microsphaera alni DC. ex Wint. var. *vaccinii* (Schw.) Salm., powdery mildew. Maine to Md., Ill., and Wis. (1); N.J. (4).
Monilia peckiana Sacc. & Vogl., on leaves. N.Y. (1).
Ophiodothella vaccinii Boyd, leaf spot. Tex. (4).
Pestalotia vaccinii (Shear) Guba, leaf spot. W. Va. (2).
Phyllosticta sp., leaf spot. N.J. (1); Pa. (2).
Pucciniastrum myrtilli (Schum.) Arth. (II,III), rust. Maine to Va. and Wis. (1); Pa. (3). O and I on *Tsuga canadensis.*
Ramularia effusa Pk., leaf spot. Wis. (1).
Rhytisma vaccinii Schw. ex Fr. (=*R. andromedae* Fr.?), tar spot. Mass. (1); S.C. (3); Okla. (4).
Sporonema oxycocci Shear, on leaves. Md. (2).
Synchytrium vaccinii Thomas, leaf gall, red spot. N.J. (1).
Valsa delicatula Cke. & Ell., on twigs. Mass., N.J. (1).

Kalmia

(1) *K. latifolia* L., mountain-laurel. Range 24, 25,26,27,28,29,30.
(2) *K. angustifolia* L., sheep-laurel, lambkill. Range 24,26,27,28,29.
(3) *K. polifolia* Wangh., bog kalmia. Range 4,12,23,24,26,27.

Evergreen shrub or small tree, much favored in cultivation for its showy flowers, zone 3 and 4; the foliage of (1) also used extensively for florists' greens. The foliage of all is poisonous to livestock, even honey derived from their flowers being reputedly toxic.

Armillaria mellea Vahl ex Fr., root rot. Md. (1).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches. N.C. (1).
Cercospora kalmiae Ell. & Ev., leaf spot. Conn. to Ala. and Tenn. (1); W. Va. (2).
C. sparsa Cke.—Miss., Pa., S.C., Tex. (1).
Corticium galactinum (Fr.) Burt, root rot. Md. (1).
Coryneum triseptatum Pk., on leaves. Maine (1).
Ceuthospora foliicola (Lib.) Cke. var. *kalmiae* Sacc., on dead leaves. N.J. (1).
Dothidella kalmiae (Pk.) Sacc., on twigs, witches'-broom. N.Y. (2); Maine, Alaska (3).
Exobasidium vaccinii Wor., leaf gall. Alaska (3).
Guignardia vaccinii Shear, on leaves. Conn., N.J., NY., Va. (1).
Hendersonia kalmicola Ell. & Barth., on twigs. N.J. (1).
Leptosphaeria kalmiae Pk., on twigs. N.Y. (2).
Lophodermium exaridum (Cke. & Pk.) Sacc., on dead leaves. N.J. (1); N.H., N.Y. (2).
Microsphaera alni DC. ex Wint. var. *vaccinii* (Schw.) Salm., powdery mildew. Wis. (3).
Mycosphaerella colorata (Pk.) Earle, bordered leaf spot. Mass. to Ga., Tex., and Ohio (1); Maine to N.C. (2).
Ovulinia azaleae Weiss, flower blight. S.C. (1).
Pestalotia kalmicola Ell. & Ev., leaf spot (?secondary). Del., N.J., Pa., Tex.. ?Wash. (1).
Phomopsis kalmiae Enlows, leaf blotch. Mass., Md., N.J., N.Y., S.C. (1).
Phyllosticta kalmicola (Schw.) Cke.: See *Mycosphaerella colorata.*
P. latifolia Ell. & Ev.—N.Y. to S.C. and Miss. (1). Doubtfully distinct from the preceding.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Polyporus versicolor L. ex Fr., wood rot. Va. (1).
Poria punctata (Fr.) Cke., wood rot. Md. (1).
P. sinuosa (Fr.) Cke.—W. Va. (1).
Rhabdospora kalmiae (*kalmiarum*) (Schw.) Ell. & Ev., on dead leaves. N.C., Pa., W. Va. (1).
Rhytisma andromedae Pers. ex Fr., tar spot. Vt. (3).
Septobasidium sp.. brown felt (on scale insects infesting branches). Tex. (1).
Septoria angustifolia Ell. & Ev., leaf spot. N.J. (2); W. Va., Wis. (3). May be a synonym of the following.
S. kalmicola (Schw.) Berk. & Curt.: See *Mycosphaerella colorata.*
Sphaerella haematodes Berk. & Curt. ex Cke.= *Mycosphaerella colorata?*
Sporonema oxycocci Shear, on leaves. Va. (2).
Stereum rameale Schw., wood rot. Va. (1).
Synchytrium vaccinii Thomas, leaf gall, red spot. N.J. (2).
Valsaria peckii (Howe) Sacc., on dead twigs. N.J. (1).
Venturia kalmiae Pk., on leaves. N.Y. (1,2), Maine (2), Alaska (3).

Ledum, Labrador-tea

(1) *L. glandulosum* Nutt. Range 4,12,13.
(2) *L. groenlandicum* Oeder. Range 4,12,23, 24,26,27.

(3) Other species.

Small evergreen shrubs of cold bogs, sometimes grown for ornament; also useful to wildlife especially (2) though reputedly poisonous to livestock.

Ascochyta ledi Rostr., leaf spot. Wis. (2).
Chrysomyxa ledi (Alb. & Schw.) d By. (II,III), rust. Calif., Idaho, Mont., Nev., Wyo. (1); Conn., Mich., N.H., N.Y., Wis. (2). O and I on *Picea* spp. *C. ledicola* (Pk.) Lagh. (II,III)—Maine, N.H., N.Y., Wash., Wis. (1); Alaska (1,3). O and I on *Picea* spp.
Coryneum triseptatum Pk., on leaves. N.Y. (2).
Cryptostictis arbuti (Bonar) Zeller, leaf spot. Calif., Oreg. (1).
Daedalea confragosa Bolt. ex Fr., on dead branches. Minn. (2).
Elsinoë ledi (Pk.) Zeller, spot anthracnose. Calif., Oreg., Wash. (1); Maine, Mich., Minn., N.Y., Pa., Wis. (2).
Exobasidium vaccinii Wor. (*E. ledi* Karst.), leaf gall. Idaho, Oreg., Wash. (1,2); Alaska (2,3).
Gibberidea turfosa Syd., on twigs. Mich. (2).
Lophodermium maculare (Fr.) de N., on dead stems: N.Y. (2); *L. orbiculare* Ehr. ex Sacc.—N.H. (2); *L. sphaerioides* (Alb. & Schw. ex Fr.) Duby—Maine, Mich., Wash., Alaska (2).
Microsphaera alni DC. ex Wint. var. *vaccinii* (Schw.) Salm., powdery mildew. Wash. (1).
Rhytisma sp. (*?R. andromedae* Pers. ex Fr.), tar spot. Idaho (1).
Sporocybe sp., on leaves. Alaska (2).
Synchytrium vaccinii Thomas, leaf gall, red spot. Maine (2).

Leiophyllum

L. buxifolium (Berg.) Ell., box sandmyrtle. Range 28,29,30.

Small evergreen shrub of sandy pine lands, sometimes grown in rock gardens; zone 5.

Exobasidium vaccinii Wor., leaf gall. N.C., N.J.

Leucothoë

(1) *L. axillaris* (Lam.) D.Don, coast leucothoë. Range 29,30.
(2) *L. catesbaei* (Walt.) A.Gray, drooping leucothoë. Range 27,28.
(3) *L. racemosa* (L.) A.Gray, sweetbells. Range 27,28,29,30.
(4) Other species.

Evergreen (1,2) or deciduous (3) shrubs of acid swampy ground; cultivated for ornament, zones 4 and 5; poisonous to livestock.

Asterina diplodioides Berk. & Curt., black spot. Ala. (4).
Clithris andromedae (Schw.) Ell. & Ev., on dead branches. N.J., N.Y., Pa. (3).
C. leucothoicola Tehon, on leaves. N.J., Pa. (1).
Cercospora leucothoës B.H.Davis, leaf spot. N.J., N.Y. (2).
Cryptostictis sp., leaf spot, canker. N.J. (2).
Exobasidium vaccinii Wor. (*E. leucothoës* P.Henn.), leaf gall. Miss. (1); N.C. (2); Mass. (3).
Hypoderma variegatum (Berk. & Curt.) Duby, on dead branches. N.C. (4).
Guignardia leucothoës (Cke.) Lind, leaf spot. Md., S.C. (1); N.C., R.I., Tenn., Va. (2). Based on *Sphaerella leucothoës* Cke., this has also been referred to *Laestadia leucothoës* (Cke.) Sacc., and *Stigmochora leucothoës* (Cke.) Hoehn.
Lophodermium orbiculare Ehr. ex Sacc., on leaves. N.C. (1).
Mycosphaerella leucothoës Miles, leaf spot. Miss. (1). Said to differ from *Sphaerella andromedae* Tracy & Earle, reported on (1) in N.C.; perhaps = *Guignardia leucothoës*.
Pestalotia leucothoës R.P.White, leaf spot. N.J. (2).
Phyllosticta terminalis Ell. & Martin (*P. leucothoës* Ell. & Martin), leaf spot. S.C. (1); N.J., N.Y. (2); Fla. (4).
Ramularia andromedae Ell. & Martin, leaf spot. N.J. (3).
Rhytisma decolorans Fr., tar spot. Tenn. (1,4); Conn., Va. (3); Fla. (4).
Septobasidium pseudopedicellatum Burt, on scale insects infesting branches. Fla. (4).
Sphaerella andromedae (Schw.) Cke., *S. leucothoës* Cke. SEE *Guignardia* and *Mycosphaerella*.
Sporomega andromedae (Schw.) Duby, on twigs. N.C. (1).
Valsa delicatula Cke. & Ell., on stems. N.J. (3).
Venturia arctostaphyli Cke. & Harkn. (*V. cassandrae* Pk.), on leaves. N.C., N.Y. (2).
V. pezizoidea Sacc. & Ell.—N.J. (3).

Lyonia

(1) *L. ferruginea* Nutt. (including *L. rigida* Nutt). Range 29,30.
(2) *L. ligustrina* (L.) DC., maleberry. Range 27,28,29,30.
(3) *L. lucida* (Lam.) K.Koch, fetterbush. Range 29,30.
(4) *L. mariana* (L.) D.Don, staggerbush. Range 20,27,28,29,30.

Evergreen (1,3) or deciduous (2,4) shrubs or small trees; sometimes cultivated for ornament, especially (1) and (2) in zone 7, (2) in zone 3.

Asterina lepidigena Ell. & Martin (*?Meliola* sp.), black spot. Fla. (1).
Ceuthocarpon ferrugineum (Ell. & Martin) Berl., leaf spot. Fla. (1).
Cryptosphaeria vexata (Cke. & Ell.) Sacc., on dead branches.
Cucurbitaria longitudinalis Pk., on dead twigs. Maine, N.J., N.Y. (2).
Cuscuta compacta Juss., dodder. Fla. (2).
?Dermea sp., on dead twigs. Mass. (2).
Diaporthe ligustrina Ell. & Ev. (=*D. eres* Nits.), on dead branches. N.J. (2).
Didymosphaeria grumata Cke. ex Rehm, on twigs. N.J. (2).
Exobasidium vaccinii Wor., leaf gall, shoot hypertrophy. Fla., Ga. (1); Ala., Fla., Mass., N.J., N.Y. (2); Fla., Md., N.Y. (4).
Hypoderma variegatum (Berk. & Curt.) Duby, on twigs. N.C. (3).
Lembosia andromedae Tracy & Earle, ?sooty mold. Ala. (3).
Microsphaera alni DC. ex Wint. var. *vaccinii* (Schw.) Salm., powdery mildew. Ala. (2).
Morenoella dothideoides (Ell. & Ev.) Hoehn., black leaf spot. Fla. (3).
Mycosphaerella sp. (*Sphaerella andromedae* Tracy & Earle), on leaves. Miss. (2,3).
Pestalotia vaccinii (Shear) Guba, leaf spot (?secondary). Fla.
Phacidium spp., on dead leaves: *P. nigrum* Cke.—Fla. (1); Ga. (2); *P. vaccinii* Fr.—Fla. (1).

Physalospora obtusa (Schw.) Cke., on dead branches. Ga. (2,3).
Poria versipora Pers. ex Rom., wood rot. Maine (2).
Pucciniastrum myrtilli (Schum.) Arth. (II,III), rust. Fla. (1); Ala., Ark., Va. (2); Ga. (3); Del. (4). O and I on *Tsuga canadensis*.
Ramularia cylindriopsis Pk., leaf blight. N.Y. (4).
Rhytisma andromedae Pers. ex Fr., large tar spot. Fla., N.J., N.Y., Va. (2); Fla. (3).
R. decolorans Fr., small tar spot. Maine to Fla. and Tenn. (2); N.C. (4).
Septoria pulchella Berk., leaf spot. Fla. (1), ?Ga.
Valsa ambiens Pers. ex Fr., on dead twigs. Ga. (3).

Menziesia

(1) *M. ferruginea* J.E.Sm., rustyleaf. Range 1,4,12,23.
(2) *M. pilosa* (Michx.) Juss., minnie-bush. Range 27.

Deciduous shrubs, sometimes grown for ornament; (1) poisonous to livestock.

Dermea sp., on dead twigs. Va. (2).
Exobasidium vaccinii Wor., leaf gall. Mont. to Oreg. and Alaska (1); Ala., N.C., Va., W. Va. (2).
Melasmia menziesii Dearn. & Barth., tar spot. Mont. and Wyo. to Oreg. and Alaska (1).
Microsphaera alni DC. ex Wint. var. *vaccinii* (Schw.) Salm., powdery mildew. Alaska (1), Va. (2).
Pucciniastrum myrtilli (Schum.) Arth. (II,III), rust. W. Va. (2). O and I on *Tsuga canadensis*.
Rhytisma sp., tar spot. Sometimes reported as *R. arbuti* Phill., or *R. dendriticum* Pk., a nomen nudum; an ascigerous stage not yet definitely connected, hence preferably referred to *Melasmia menziesii*.

Oxydendrum

O. arboreum (L.) DC., sourwood, sorreltree. Range 25,27,28,29,30.

Medium to large deciduous tree, cultivated for ornament, zone 4; wood used commercially; an important honey plant; useful to wildlife.

Cenangium andromedae (Schw.) Fr., on dead branches. N.C.
Cercospora oxydendri Tracy & Earle, leaf spot. Ala., Miss., Tex., W. Va.
Godronia rugosa Ell. & Ev., on dead twigs. Ala., Ga.
Hypoderma variegatum (Berk. & Curt.) Duby, on dead twigs. N.C.
Mycosphaerella caroliniana (Wolf) J.H.Miller, leaf spot. Ga., N.C., Tex., Va., W. Va.
Pezicula sp., on dead branches. Ga.
Phyllosticta oxydendri Ell. & Ev.: See *Mycosphaerella caroliniana*.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. Ga.
Poria punctata (Fr.) Cke., wood rot. W. Va.
Rhabdospora oxydendri (Ell. & Ev.) Sherb., on twigs. N.C., W. Va.
Sphaerulina polyspora Wolf, twig blight. N.C.
Tryblidiella rufula (Spreng. ex Fr.) Sacc., on dead branches. Ga.
Venturia oxydendri Wolf, on fallen leaves. Ga., N.C.

Phyllodoce, mountainheather

(1) *P. empetriformis* (J.E.Sm.) D.Don
(2) Other species.

Low evergreen shrubs of Arctic regions and high altitudes, mostly in the Northwest; minor honey plants and sometimes used in rock gardens; useful to wildlife.

Antennaria rectangularis Sacc. (*?Antennularia* sp.), on foliage. Alaska (2). An invalid name as applied to a fungus.
Diplodina rostrupii Vest., on stems. Alaska (2).
Exobasidium vaccinii-uliginosi Boud., witches'-broom. Oreg., Wash. (1).
Herpotrichia nigra Hartig, brown felt blight. Idaho, Oreg., Wash. (1).

Pieris

(1) *P. floribunda* (Pursh) Benth. & Hook., mountain andromeda. Range 27.
(2) P. japonica (Thunb.) D.Don., Japanese andromeda.

Evergreen shrubs: (1) native, often cultivated, zone 4; (2) introduced from Japan, cultivated, zone 5.

Armillaria mellea Vahl ex Fr., root rot. N.J. (2).
Pestalotia sp., leaf spot. Conn., N.J. (2).
Phyllosticta andromedae West., leaf spot. N.J. (1,2).
?P. maxima Ell. & Ev.—Conn. (1).
Phytophthora sp., dieback. Pa. (2).
Rhytisma andromedae Pers. ex Fr., tar spot. Fla., Ga. (on *P. phillyreifolia* (Hook.) DC. = *Lyonia?*)

Rhododendron

I. Cultivated Azaleas

Flowering shrubs derived by selection and hybridization from numerous, chiefly exotic, *Rhododendron* spp., especially those constituting the following horticultural groups: A. Evergreen or nearly so—(1) Indian azaleas (*R. mucronatum* G.Don, *R. pulchrum* Sweet, *R. simsii* Planch.); (2) Kurume and Kurume hybrid azaleas (*R. obtusum* (Lindl.) Planch. and hybrids with (1) and (3)); (3) Kaempferi and Kaempferi hybrids (*R. obtusum* var. *kaempferi* (Planch.) Wils.); (4) Macrantha azaleas (*R. indicum* (L.) Sweet). B. Deciduous—(5) Ghent azaleas (× *R. grandavense* (K. Koch) Rehd.); (6) Mollis azaleas (*R. japonicum* (A.Gray) Swingar and *R. molle* (Bl.) G.Don). Group A is cultivated chiefly in the eastern part of zones 7 to 9, or universally under glass; Group B, in the eastern part of zones 5 and 6.

Alternaria tenuis Nees ex Cda., secondary flower spotting after abrasion or environmental injury. S.C., doubtless cosmopolitan (*).
Armillaria mellea Vahl ex Fr., root rot. Calif., N.J., Wash.
Botrytis cinerea Pers. ex Fr., secondary flower blight (usually after frost), also shoot-tip blight, seedling and cutting blight. Cosmopolitan (*).
Cercospora sp., leaf spot. Ala., Ga., Md., Miss., Pa., Va. (1,2). Reported in part as *C. handelii* Bub. and *C. rhododendri* Em. Marchal & Verpl. (=*Cercosporina rhododendri* (Ferr.) Sacc.?) but the distinctions are tenuous; *C. handelii* is earlier.
Cladosporium herbarum Pers. ex Lk., secondary flower spot. Cosmopolitan (*).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1,2).

Cuscuta sp., dodder. S.C.
C. gronovii Willd.—Fla., S.C. (1); N.J.
Epicoccum ?purpurascens Ehr. ex Wallr., secondary flower spot. N.C., S.C. (1,2).
Exobasidium vaccinii Wor. (*E. azaleae* Pk.), leaf and stem gall, "rose-bloom." General (1,2,3,4; probably on all types). *?E. burtii* Zeller has also been reported as causing a yellow leaf spot on *R. luteum* in N.J.
Microsphaera alni DC. ex Wint., powdery mildew. N.J., N.Y., Pa., R.I., Va. (5,6).
Ovulinia azaleae Weiss, flower spot, limp blight. Southeastern and Gulf States from Md. to Fla. and Tex.; Calif. Chiefly (1) but all others are susceptible and occasionally infected.
Pellicularia koleroga Cke., thread blight. La. (1).
Pestalotia spp. (*?P. guepini* Desm., *?P. macrotricha* Kleb.), secondary flower and leaf spot, also on twigs and bark. General (1,2, and probably others).
Phomopsis sp., on twigs and branches, ?canker, dieback. Ala., Mass., Md., S.C., Tex. (1,3,?5).
Phyllosticta sp. (*P. rhododendri* West.), leaf spot. Ga., La., S.C. (1,2).
Physalospora abdita (Berk. & Curt.) N.E.Stevens and *P. rhodina* (Berk. & Curt.) Cke., on dead branches. N.C.
?P. obtusa (Schw.) Cke., on leaves. Miss.
Physarum cinereum (Batsch) Pers., slime mold on seedlings. N.J.
Phytophthora cinnamomi Rands, root and stem rot, wilt. Ala., Md., Mo. (1,2).
Pucciniastrum myrtilli (Schum.) Arth. (II,III), rust. N.J. Reported on *R. luteum* Sweet, a component of group B-5, in N.J.
Pythium irregulare Buism. and *P. ultimum* Trow, root rot. Calif.
Ramularia angustata Pk., leaf spot. Miss.
Rhizoctonia solani Kuehn, damping-off, root and stem rot. Cosmopolitan in propagating beds (*).
Septoria azaleae Vogl., angular leaf spot. Widespread, perhaps general, but few authentic reports; especially on evergreen varieties under greenhouse conditions and in the Southeastern States.
Sphaeropsis sp., leaf spot. N.J. *?Physalospora.*
Trichoderma viride Pers. ex Fr. (*T. lignorum* Tode ex Harz), secondary flower spot. N.C., S.C. (1,2).
Verticillium ?albo-atrum Reinke & Berth., wilt. Mass.
CHLOROSIS, YELLOW LEAF—physiological, attributed to iron deficiency but sometimes due to defective drainage. General in neutral or alkaline soils, especially on evergreen varieties.

II. Native Azaleas

(1) *Rhododendron arborescens* (Pursh) Torr., sweet azalea. Range 27.
(2) *R. calendulaceum* (Michx.) Torr., flame azalea. Range 27,28.
(3) *R. canadense* (L.) Torr., rhodora. Range 26,27. Also *R. vaseyi* A.Gray. Range 27.
(4) *R. nudiflorum* (L.) Torr., pinxterbloom. Range 25,26,27,28,29,30. Including the closely related *R. canescens* (Michx.) Sweet of the Southeastern Coastal Plain, and *R. roseum* (Loisel) Rehd. of the northern Appalachians and westward.
(5) *R. occidentale* A.Gray, western azalea. Range 4.
(6) *R. viscosum* (L.) Torr., swamp azalea. Range 25,26,27,28,29,30.
(7) Other species.

Deciduous flowering shrubs, cultivated for ornament, especially (1,2, and 6), in their respective ranges.

Botrytis cinerea Pers. ex Fr., gray mold of flowers, especially after chilling. Frequent on (4).
Briosia azaleae (Pk.) Dearn., bud and twig blight. Mass., N.H., N.J. (1,4,6); N.C. (on *R. vaseyi*). Also reported as *Periconia azaleae* Pk. and *Sporocybe azaleae* (Pk.) Sacc., but not admissible in these genera as now interpreted. *Pycnostysanus azaleae* (Pk.) Mason appears to duplicate *Briosia azaleae.* An ascigerous stage, tentatively referred to *Ceratostomella* but not named, has also been reported.
Cercospora handelii Bub., leaf spot. S.C. (7).
Colletotrichum azaleae Ell. & Ev., leaf spot. Fla. (6).
Colpoma azaleae (Schw.) Cke., on dead branches. Ga., N.C., Pa., Va. (4).
Dendrophoma azaleae Dearn. & House, on dead branches. N.Y. (4).
Diaporthe eres Nits., on dead branches. Calif. (5).
Erysiphe polygoni DC., powdery mildew. Va. (4); Calif. (5).
Exobasidium vaccinii Wor. (*E. azaleae* Pk.), leaf and stem gall, "rose-bloom." Widespread (1,2,3,4,6,7), usually sparse but sometimes abundant, especially on (4), from Maine to Fla. and Tex. *E. burtii* Zeller, yellow leaf spot. Idaho, Oreg., Wash. (on *R. albiflorum* Hook.). *E. decolorans* Harkn., reported on (5) in Calif., is of doubtful status, and may be identical with the preceding.
Melasmia menziesii Dearn. & Barth. (=*M. rhododendri* Sacc.?), tar spot. Wash. (7).
Microsphaera alni DC. ex Wint. var. *vaccinii* (Schw.) Salm., powdery mildew. Ga. (2); N.Y., Pa., Va. (4).
Monilinia azaleae Honey, twig blight. Ga., N.Y. (4).
Ovulinia azaleae Weiss, flower spot. S.C. (4).
Pestalotia ?guepini Desm., leaf spot. N.Y. (1); W. Va. (6).
Phyllosticta sp. (*P. rhododendri* West.?), leaf spot. Ala. (4), Fla. (6).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora abdita (Berk. & Curt.) N.E.Stevens, on dead branches. Ga. (6).
Pucciniastrum myrtilli (Schum.) Arth. (II,III), rust. Maine, N.H. (3); Mass. to Fla. and Tex. (4,6); Fla., Ga. (7). O and I on *Tsuga canadensis.*
Ramularia angustata Pk., leaf spot. N.Y. (4).
Septoria solitaria (*solitaris*) Ell. & Ev., leaf spot. Calif., Oreg. (5); Tex.
Synchytrium vaccinii Thomas, leaf gall. N.J. (6).
Valsa delicatula Cke. & Ell., on dead twigs. N.J. (6).

III. Cultivated Rhododendrons

(1) *Rhododendron catawbiense* Michx., Catawba rhododendron. Range 27,28.
(2) *R. maximum* L., rosebay. Range 24,26,27.
(3) Others—hybrids between (1) and (2) together with European and Asiatic species, as *R. arboreum* J.E.Sm., *R. caucasicum* Pall., *R. ponticum* L. (used extensively as rootstock for grafting), and others.

Large evergreen flowering shrubs, cultivated for ornament, zone 4, sparingly zone 3. See the following section for native species other than (1) and (2).

Alternaria sp., damping-off. Conn. (1).
Armillaria mellea Vahl ex Fr., root rot. N.J., N.Y. (1); Calif. (3).

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., dieback, branch canker, ? leaf spot. Md., Mass., N.J., N.Y. (*).

Botrytis cinerea Pers. ex Fr., flower and shoot blight (usually following chilling), seedling blight. Calif., N.J., N.Y. (*).

Briosia azaleae (Pk.) Dearn., bud and twig blight. Ga., N.C., N.J., N.Y., Pa., Tenn., Va. (1,2); N.J. (3). See note in section II.

Cercospora handelii Bub., leaf spot. Fla., N.C., N.J., Va. (*).

C. rhododendri Em. Marchal & Verpl. (=*Cercosporina rhododendri* Ferr. ex Sacc.?)—Calif., N.J., N.Y., N.C. (1,3). See note in section I.

Chrysomyxa sp. (II), rust. N.J. (on *R. ponticum* seedlings).

C. roanensis Arth. (II,III)—Tenn. (1). O and I unknown.

Coccomyces coronatus (Schum. ex Fr.) de N., on leaves and twigs. Ga., N.C., Va. (1,2).

C. rhododendri (Schw.) Sacc.—Pa., Va., W. Va. (1,2).

Coryneum rhododendri Schw., leaf spot (?secondary). N.C., Pa., Tenn., Va. (1,2).

C. triseptatum Pk.—N.Y., Tenn. (2).

Cryptostictis mariae (G.W.Clint. ex Pk.) Sacc., leaf spot. Ky., N.Y., Tenn., Va. (1,2).

Cuscuta gronovii Willd., dodder. N.J. (3).

?Dermatea lobata Ell., on dead leaves. N.C., W. Va. (2). A confused name, probably *Velutaria* sp. in part, according to Groves; characteristically twig and bark-inhabiting.

Diaporthe eres Nits., on dead branches. N.C. (1).

Diplodina eurhododendri Voss, on leaves. Calif. (3).

Discosia artocreas Tode ex Fr., leaf spot (secondary). Md., N.Y. (1,2).

Exobasidium vaccinii Wor., leaf and shoot gall. Mass. to Fla. and Miss. (*).

E. burtii Zeller, yellow leaf spot. N.J. (3).

E. vaccinii-uliginosae Boud., witches'-broom. N.J. (3).

Gloeosporium sp. (*?G. rhododendri* Briosi & Cav.), canker, ?leaf spot. Md., N.Y. (3).

Glomerella cingulata (Ston.) Spauld. & Schrenk, canker, dieback. Md. (3).

Guignardia rhodorae (Cke.) B.H.Davis, leaf spot. Conn., Mass., Md., N.J., N.Y., Pa., Va. (*).

Hendersonia concentrica Ell. & Ev., leaf spot. N.C., Tex. (1); W. Va. (2).

Hymenochaete agglutinans Ell., on branches, ?canker. Pa., Tenn. (2).

Laestadia rhodorae (Cke.) Berl. & Vogl., also *L. rhododendri* of Amer. auths.: SEE *Guignardia rhodorae.*

L. rhododendri (de N.) Sacc.: SEE *Physalospora rhododendri.*

Lophodermium schweinitzii M.Wils. & Robertson (*L. rhododendri* Amer. auths., not Ces.), leaf spot. N.Y. to N.C. and Tex. (1); Vt. to N.C. and W. Va. (2).

L. melaleucum (Fr.) de N., reported in N.C. and Tenn. (1), may not be distinct.

Microsphaera alni DC. ex Wint., powdery mildew. Md., N.Y. (1); N.J. (1,3).

Mycosphaerella clintoniana House (*M. rhododendri* (Cke.) Siem.), leaf spot. N.C., N.J., N.Y. (1,2); Oreg., Wash. (3).

Ovulinia azaleae Weiss, flower spot. S.C. (1); Calif. (3).

Pestalopezia rhododendri Seaver, leaf spot. Tenn., W. Va. (2); ?N.Y.

Pestalotia macrotricha Kleb., "gray blight" of foliage and twigs following winter injury. General (*).

P. rhododendri (D.Sacc.) Guba, secondary leaf spot. N.J. (3).

P. vaccinii (Shear) Guba—Del., Ind., N.C. Reports of *P. guepini* Desm. in Conn., N.Y., Pa., W. Va. (1,2) probably belong in one of the preceding species.

Pezicula rhododendricola Rehm, on dead twigs. Pa. (2).

Phomopsis sp., leaf spot, twig blight (?secondary). Conn., N.J., N.Y., Pa. (1,3).

Phyllosticta maxima Ell. & Ev., also *P. saccardoi* Thuem.: SEE *Guignardia rhodorae.*

P. rhododendri West., leaf spot. N.J. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).

Physalospora rhododendri (de N.) Rehm, leaf spot. Pa., Tenn., Va. (2). SEE ALSO *Guignardia rhodorae.*

P. obtusa (Schw.) Cke., on dead branches. Ohio (2).

Phytophthora cactorum (Leb. & Cohn) Schroet., blight, dieback. Mass., Md., N.J., N.Y., Ohio, Pa., R.I. (*).

P. cinnamomi Rands, wilt, root rot of seedlings and nursery plants. N.J., N.Y. (1; 3, especially *R. ponticum*).

Polyporus caesius Schrad. ex Fr., on dead branches. Va. (2).

P. pargamenus Fr.—Ala. (2).

Pucciniastrum myrtilli (Schum.) Arth. (II,III), rust. Conn., N.J., R.I. (on *R. lutescens* Franch. and *R. ponticum*). O and I on *Tsuga canadensis.*

Ramularia sp., leaf spot. Calif.

Rhizoctonia solani Kuehn, damping-off, stem rot. Conn., N.J., N.Y. (*).

Septoria rhododendri Cke., leaf spot. Maine (1); N.C. (2).

Sphaeropsis sp., dieback, ?leaf spot. N.J., Pa. (1,2).

Sporocybe azaleae (Pk.) Sacc.: SEE *Briosia azaleae.*

Sporonema oxycocci Shear, on dead leaves. Va. (2).

Stereum rugosum Pers. ex Fr., on dead branches. Tenn. (1).

Trametes isabellina Fr., on dead branches. N.C. (2).

?Venturia rhododendri Tengwall, leaf spot. Md., Va. (2).

LEAF SCORCH, TIPBURN — physiological, usually due to desiccation, sometimes to low temperature. General near limits of hardiness, especially (1) and (3).

OEDEMA, INTUMESCENCE (of leaves) — cause unknown. Calif., N.J. (3).

WALNUT TOXICITY—poisoning by root emanation from *Juglans nigra.* N.J. (1).

IV. Native Rhododendrons

(1) *Rhododendron carolinianum* Rehd., Carolina rhododendron. Range 27. Including *R. minus* Michx., piedmont rhododendron. Range 28,29. Cultivated, zone 5.

(2) *R. macrophyllum* G.Don (*R. californicum* Hook.), coast rhododendron. Range 1,2. Cultivated, zone 6.

(3) Other species. For *R. catawbiense* and *R. maximum* see preceding section.

Briosia azaleae (Pk.) Sacc., bud and twig blight. Calif., Oreg., Wash. (2).

Chrysomyxa roanensis Arth. (II,III), rust. N.C., Tenn. (on *R. minus*). O and I unknown.

C. piperiana (Arth.) Sacc. & Trott. (II,III)—Calif., Oreg., Wash. (2). O and I on *Picea sitchensis.*

Coccomyces coronatus (Schum. ex Fr.) de N., on leaves and twigs, ?dieback. Calif., Oreg., Wash. (2).

Coryneum rhododendri Schw., ?leaf spot. Oreg., Wash. (2). Has been confused with *Cryptostictis.*

C. triseptatum Pk.—Tenn. (1).

Cryptostictis mariae (G.W.Clint. ex Pk.) Sacc., leaf spot. Calif., Oreg., Wash. (2).
Encoeliopsis rhododendri (Ces. ex Rehm) Nannf., on seed capsules and twigs. Calif., Oreg. (2). Also reported in the conidial stage, *Diplodina eurhododendri* Voss.
Exobasidium vaccinii Wor., leaf gall. Tenn. (1), Oreg. (2).
E. vaccinii-uliginosi Boud., witches'-broom. Calif., Oreg., Wash. (2).
Gloeosporium ferrugineum Dearn., leaf spot. N.C.
Guignardia rhodorae (Cke.) B.H.Davis, leaf spot. Conn., N.C., N.J., N.Y. (1); ?Oreg. (2).
Hendersonia concentrica Ell. & Ev., leaf spot. N.C. (1).
Leptothyrium parvulum Dearn., on leaves. N.C. (1).
Lophodermium schweinitzii M.Wils. & Robertson (=*L. rhododendri* Ces.?), leaf spot, ?twig blight. Oreg., Wash. (2).
Melasmia rhododendri Sacc., tar spot. Alaska (3).
Mycosphaerella sp., leaf spot. N.C. (1); Wash. (2).
Pestalotia macrotricha Kleb., gray leaf spot. N.C., N.J., N.Y., Tenn. (1); Calif. (2). May include *?P. guepini* Desm.—as reported in N.Y., Tenn. (1); Oreg. (2).
Phacidium vaccinii Fr., on fallen leaves. Oreg. (2).
Phomopsis sp., on twigs, ?dieback. N.J. (1).
P. ericaceana Fairm., on leaves. Calif. (2).
Phyllosticta maxima Ell. & Ev. and *P. saccardoi* Thuem.: See *Guignardia rhodorae*. *P. rhodorae* (Cke.) Tassi, reported on (2) in Oreg., may also be a synonym.
Phytophthora cinnamomi Rands, wilt, root rot. Md., N.J., N.Y. (1).
Rhizoctonia solani Kuehn, root and collar rot (?secondary). N.J., Tenn. (1).
Septoria solitaria (*solitaris*) Ell. & Ev., leaf spot. N.C. (1).
Sphaceloma sp., spot anthracnose. Wash. (2).

Vaccinium

I. Subgenus *Batodendron*

Vaccinium arboreum Marsh., farkleberry, tree-huckleberry. Range 17,20,25,27,28,29,30.

Small tree, evergreen southward; useful to wildlife.

Cylindrosporium sp., leaf spot. Tex.
Exobasidium vaccinii Wor., leaf gall. Ala., Fla.
Mycosphaerella vaccinii (Cke.) Schroet., on leaves. Ga.
Ophiodothella vaccinii Boyd, flyspeck leaf spot. N.C. to Fla., Tex., and Ill.
Pestalotia vaccinicola Guba, secondary leaf spot. Fla.
Phyllosticta vaccinii Earle, leaf spot. Ala., Fla., Miss., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. Ala.
Rhytisma vaccinii Schw. ex Fr., tar spot. Fla., Okla., Tex.
Septobasidium sinuatum Couch, brown felt (on scale-infested branches.) Fla.
Septoria albopunctata Cke., purple-bordered leaf spot. Fla., S.C., Tex.

II. Subgenus *Cyanococcus*, Blueberries

(1) *Vaccinium angustifolium* Ait., together with *V. myrtilloides* Michx. and *V. lamarckii* Camp, lowbush blueberries, sugar blueberries. Range 22,23,24,26,27.
(2) *V. ashei* Reade, rabbiteye blueberry, together with *V. amoenum* Ait., *V. tenellum* Ait., and *V. virgatum* Ait., cluster blueberries. Range 27,28,29,30.
(3) *V. corymbosum* L., northern highbush blueberry, together with *V. atrococcum* Heller, black highbush blueberry, and *V. australe* Small, southern highbush blueberry. Range 22,23,24,26,27,28,29.
(4) *V. pallidum* Ait. and *V. simulatum* Small, upland blueberries; also *V. alto-montanum* Ashe and *V. vacillans* Torr., dryland blueberries. Range 22,23,24,25,26,27,28,29.
(5) Other species.

Deciduous shrubs (except some species of (2) which are evergreen) bearing edible fruit, which is picked commercially in natural stands or grown in cultivated plantations. Cultivated blueberries derived mainly from (2) are grown in the Gulf States; from (3) in North Carolina, New Jersey, and Massachusetts, also Indiana and Michigan; they are polyploids or interspecific hybrids involving also some of the other groups.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Mich., N.J., N.Y., Oreg. (3); Miss.
Alternaria sp., secondary leaf and twig blight. Mass., N.C., N.J. (3).
Bifusella vaccinii Tehon, on leaves. N.H., N.J. (1).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on twigs and leaves. N.J. (3).
Botrytis cinerea Pers. ex Fr., blossom, fruit, and twig blight. Maine, Mass., N.J. (1,3); Calif., Oreg., Wash. (3).
Coniothyrium vaccinicola (Schw.) Starb., on twigs. Mass., Pa. (3).
Cryptosphaeria vexata (Cke. & Ell.) Sacc., on dead branches. N.J. (3).
Curvularia inaequalis (Shear) Boed., on leaves and twigs. N.J. (3).
Cuscuta sp., dodder. Pa. (1).
Diaporthe vaccinii Shear, twig blight. Maine, Mass., N.J. (3).
Discohainesia oenotherae (Cke. & Ell.) Nannf., leaf spot. N.J., ?N.C. (3).
Dothichiza caroliniana Demaree & M.S.Wilcox, leaf spot. N.C. (3).
Dothidella vacciniicola Dearn. & House, twig canker. N.C. (on *V. atrococcum*).
Exobasidium vaccinii Wor., leaf and shoot gall, "rose-bloom." Maine to Miss., Tex., and Wis.; Pacific Northwest (*).
Gloeocercospora inconspicua Demaree & M.S.Wilcox, leaf spot. N.C. (2,3), Md. (3).
Gloeosporium sp., anthracnose. Fla., N.J. Perhaps the conidial stage of the following.
Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf and twig blight. N.J., N.Y. (3).
Gloniella vaccinicola Dearn. & House, on dead twigs. N.Y. (3).
Gloniopsis sp., on dead twigs. Va. (3).
Godronia kalmiae (Rehm) Seaver, on dead branches. ?N.J. (3).
Leptosphaeria coniothyrium (Fckl.) Sacc., on twigs. Oreg. (3).
Lepothyrium conspicuum Dearn. & House, leaf spot. Ga. (3); N.Y. (4).
Lophodermium maculare (Fr.) de N., on leaves. N.J. (3), Ga. (4).
Melanospora destruens Shear, on roots and stems. Mass., N.C., N.J., (3).
Meliola nidulans (Schw.) Cke., black mildew. Ala., Ga. (4,5).

Microsphaera alni DC. ex Wint. var. *vaccinii* (Schw.) Salm., powdery mildew. General (*).
Monilia peckiana Sacc. & Vogl., on leaves. N.Y. (1). Probably conidial stage of the following.
Monilinia vaccinii-corymbosi (Reade) Honey, mummy berry, blossom and twig blight. Maine (1,3); Miss. (2); Ind., Mass., Md., Mich., N.C., N.J., N.Y., Pa. (3).
Mycosphaerella vaccinii (Cke.) Schroet., on leaves. N.Y. (3).
Myriangium asterinosporum (Ell. & Ev.) J. H. Miller, on branches infested with scale insects. Ga. (3).
Ophiodothella vaccinii Boyd, flyspeck leaf spot. Miss. (2).
Pestalotia vaccinii (Shear) Guba, on leaves and twigs. Maine (1); Mass., N.C., N.J. (3).
Phoma houseana Sacc., on dead twigs. N.J., N.Y. (3).
P. vaccinii Dearn. & House—N.Y. (3). *P. vaccinii* Karst. has priority.
Phomopsis sp., stem gall. Mass., Mich., N.J., Oreg., Wash. (3).
P. vaccinii Shear et al.: SEE *Diaporthe vaccinii*.
Phyllosticta sp., leaf spot. Fla. (2); Ala. (3).
P. cyanococci Dearn. & House—N.C., N.Y. (3).
?P. vaccinii Earle—N.J. (3).
Phyllostictina vaccinii Demaree & M.S. Wilcox, leaf spot, dry rot of fruit. Ga., Md., Miss., N.C. (2); Ga., Md., N.C. (3).
Physalospora corticis Demaree & M.S.Wilcox, cane canker. Ga., Miss., N.C. (2,3).
P. obtusa (Schw.) Cke., on twigs and roots. N.C., N.J. (3).
Piggotia vaccinii J. J. Davis, leaf spot. Wis. (1).
Pucciniastrum goeppertianum (Kuehn) Kleb., rust witches'-broom (III). Maine to Pa. and Minn. (1,3); Oreg. (3). O and I on *Abies* spp.
P. myrtilli (Schum.) Arth. (II,III), leaf rust. Maine to Fla. and Ark. (*); O and I on *Tsuga canadensis*.
Ramularia effusa Pk., on leaves. Mich., Wis. (1); Md. (4).
R. vaccinii Pk., brown leaf spot. Fla., Md., Mich., N.J., N.Y. (1,3).
?Rhizoctonia sp., ectotrophic mycorhiza. Ind. (1,3,4), probably general.
Rhytisma vaccinii Schw. ex Fr., tar spot. Ga., Md., Va., W. Va. (3,4).
Sclerotinia vaccinii-corymbosi Reade: SEE *Monilinia vaccinii-corymbosi*.
Septoria albopunctata Cke., eyespot, purple-bordered leaf spot, sometimes on twigs. Fla., Ga., N.C. (2,3).
S. difformis Cke. & Pk., leaf spot. N.Y. (1). Perhaps identical with *Ramularia vaccinii*. Leaf spots attributed to *Septoria* sp. and to *S. stemmatea* (Fr.) Berk. have been reported from Maine and Wis. (1).
Sporomega degenerans (Fr.) Cda., on dead twigs. N.J. (3).
Streptomyces (*Actinomyces*) sp., stem gall, witches'-broom. Md. (?1).
Synchytrium vaccinii Thomas, red leaf gall. Maine (1), Miss. (3).
Thelephora terrestris Fr., encircling (?strangling) canes. N.J. (3).
Valsa delicatula Cke. & Ell., on dead twigs. Mass., N.J. (1,3).
Valsaria peckii (Howe) Sacc., on dead twigs. N.Y. (3).
STUNT—unidentified virus. Mich., Mass., N.C., N.J., N.Y. (3).

III. Subgenus *Euvaccinium*

A. Bilberries and whortleberries (deciduous)

(1) *Vaccinium caespitosum* Michx., dwarf bilberry. Range 4,7,12,13,23,24,26,27.
(2) *V. membranaceum* Dougl. ex Hook. Range 1,4,12,13,15,23,24.
(3) *V. myrtillus* L. (*V. oreophilum* Rydb.), whortleberry. Range 12,13,14.
(4) *V. ovalifolium* J.E.Sm., blue whortleberry. Range 2,4,12,23,24.
(5) *V. uliginosum* L., bog bilberry. Range 1,4, 12,13,14,23,24,26,27.
(6) Other species.

Mostly low shrubs of boreal or alpine zones, sometimes grown in wild gardens; some are important wildlife-food plants and furnish browse for livestock.

Cenangella urceolata (Ell.) Sacc., on dead twigs. Oreg. (6).
Exobasidium vaccinii Wor., leaf and shoot gall. Occasionally on all species in their range; reported from Mont. to Oreg. and Alaska (1,2,4,5,6).
E. parvifolii Hotson, proliferating stem gall. Oreg., Wash. (4,6).
E. vaccinii-uliginosi Boud., shoot gall, "rose-bloom." Oreg. (2).
Godronia cassandrae Pk., on twigs. Maine, Alaska (1); Oreg., Wash. (3).
Leptothyrium conspicuum Dearn. & House, on leaves. Alaska (4,6).
Lophodermium maculare (Fr.) de N., on leaves. Maine (5).
Microsphaera alni DC. ex Wint. var. *vaccinii* (Schw.) Salm., powdery mildew. Wyo. (3,6); Oreg., Wash., Alaska (6).
Monilinia ledi (Nawaschin) Honey, twig blight, berry rot. N.Y. (5).
?M. oxycocci (Rostr.) Honey—Alaska (6).
Mycosphaerella vaccinii (Cke.) Schroet., on leaves. N.Y. (5).
Podosphaera oxyacanthae (DC.) dBy., powdery mildew. Alaska (5,6).
Pucciniastrum sp. (II), leaf rust. Oreg., Wash. (2). O and I perhaps *Peridermium ornamentale* Arth. on *Abies*.
P. goeppertianum (Kuehn) Kleb. (III), rust witches'-broom. General (*). O and I on *Abies* spp.
P. myrtilli (Schum.) Arth. (II,III), leaf rust. General (*). O and I on *Tsuga canadensis*.
Rhytisma vaccinii Schw. ex Fr., tar spot. Alaska (6).
Septogloeum sp., leaf spot. Alaska (6).

B. Evergreen blueberries

(1) *Vaccinium myrsinites* Lam., ground blueberry. Range 28,29,30.
(2) *V. ovatum* Pursh, box blueberry. Range 1,2,5.
(3) *V. vitis-idaea* L., especially the var. *minor* Lodd., mountain cranberry, lingonberry.

Shrubs (1,2) or mat-forming vine (3), bearing edible fruit; the foliage of (2) is extensively used for florists' greens, also an important wildlife-food plant and useful in erosion control; the fruit of (3) is sometimes marketed commercially from natural stands.

Ceuthospora latitans (Fr.) Hoehn., leaf spot. Alaska (3).
C. minima Cke. & Harkn.—Calif. (2).
Coccomyces albidus (Phill. & Harkn.) Sacc., on leaves. Calif. (2).
Exobasidium vaccinii Wor., leaf and shoot gall. Calif., Oreg. (2). Maine, N.Y., Alaska (3).
E. vaccinii-uliginosi Boud., witches'-broom. Oreg. (2).
Gibbera vaccinii Sow. ex Fr., on stems. Alaska (3).

Godronia cassandrae Pk., on twigs. Maine, Alaska (3).
Lophodermium maculare (Fr.) de N., on leaves. Oreg. (2).
L. melaleucum (Fr.) de N. var. *epiphyllum* Zeller—Oreg. (2).
L. oxycocci (Fr.) Karst.—Alaska (3).
Pestalotia maculiformis Guba & Zeller, leaf spot. Oreg., Wash. (2).
Pezicula myrtillina Karst., on leaves. Calif. (2).
Phyllosticta sparsa Bonar, leaf spot. Calif. (2).
Poria ferruginosa (Schrad. ex Fr.) Karst., on dead branches. Calif. (2).
Pucciniastrum goeppertianum (Kuehn) Kleb. (III), rust witches'-broom. Calif., Oreg., Wash. (2); Maine to Minn. and Alaska (3).
P. myrtilli (Schum.) Arth. (II,III), leaf rust. Fla. (1), N.H. (3).
Venturia vaccinii Ell. & Ev., on leaves. Wash. (2).

IV. Subgenus *Oxycoccus*, Cranberries

(1) *Vaccinium macrocarpon* Ait. (*Oxycoccus macrocarpon* (Ait.) Pers.), American cranberry. Range 22,23,24,25,26,27.

(2) *V. oxycoccus* L. (*O. microcarpus* Turcz., ? *O. quadripetalus* Gilib.), European cranberry. Range 23,24,26,27. Also var. *intermedium* Gray, in range 1,2,12.

Trailing evergreen vines, source of cultivated cranberries, which are grown commercially chiefly in Massachusetts, New Jersey, Wisconsin, Oregon, and Washington.

Acanthorhyncus vaccinii Shear, blotch rot of berries, also on leaves. Maine to N.C. and Wis.; Oreg., Wash. (1).
Alternaria sp., storage rot. Ind., Mass., N.J., Wis., Oreg., Wash.
Arachniotus trachyspermus Shear, on berries, ?storage rot. N.J. (1).
Botrytis cinerea Pers. ex Fr., blossom blight, gray-mold storage rot. Wash.
Ceuthospora lunata Shear, black rot of berries, leaf spot. Mass., N.J., Wis., Oreg. (1); Wash. (1,2).
Cladosporium oxycocci Shear, leaf mold. N.J. Secondary storage rot—N.J., Wash.
Curvularia inaequalis (Shear) Boed., secondary rot and leaf spot. Ill., N.J., Wis.
Diaporthe vaccinii Shear, storage rot. General (1,2).
Diplodia vaccinii Berl. & Roum., on twigs. Mass., N.J.
Discohainesia oenotherae (Cke. & Ell.) Nannf., leaf spot, storage rot. Mass., N.J., Oreg., Wash., W. Va.
Discosia artocreas Tode ex Fr., on dead leaves. Cosmopolitan.
Exobasidium vaccinii Wor. (*E. oxycocci* Rostr.), leaf gall, shoot hypertrophy, "rose-bloom." General (1,2).
Fusicoccum putrefaciens Shear: See *Godronia cassandrae.*
Gloeosporium minus Shear, on leaves and fruit. Md., N.J.
Glomerella cingulata (Ston.) Spauld. & Schrenk var. *vaccinii* Shear, bitter rot of berries, leaf spot. General.
Gnomonia setacea (Pers. ex Fr.) Ces. & de N., on dead stems. Oreg., Wash.
Godronia cassandrae Pk., end rot. General (1,2).
Guignardia vaccinii Shear, early rot, scald, blast. General.
Leptosphaeria coniothyrium (Fckl.) Sacc., on twigs. Oreg.
Leptothyrium oxycocci Shear: See *Godronia cassandrae.*
Leptothyrium pomi (Mont.) Sacc.—on fruit. N.J.
Lophodermium hypophyllum (Dearn. & House) Shear, on leaves. Mich., Minn., N.Y., Wis., Oreg., Wash. (1,2).
L. oxycocci (Fr.) Karst.—Maine, Mass., N.J., Alaska (1); Mich. (2).
Melanospora destruens Shear, storage rot. In markets.
Microsphaera alni DC. ex Wint. var. *vaccinii* (Schw.) Salm., powdery mildew. Ala., N.J., Ohio.
Monilinia oxycocci (Wor.) Honey, hard rot, "cotton-ball," twig blight. Maine, Mass., Wis.; Oreg., Wash. (1,2).
Mycosphaerella nigromaculans Shear, black spot. Oreg., Wash.
M. vaccinii (Cke.) Schroet., on leaves. Mass., N.J.
M. oxycocci Dearn. & House: See *Guignardia vaccinii.*
Myxofusicoccum callunae Shear: See *Phacidium vaccinii.*
Naevia oxycocci Dearn., witches'-broom. Maine, Mich., N.H., N.Y. (1,2).
Oidium macrosporium (Farl.) Linder, on leaves. N.J.
Penicillium spp., blue-mold rot. Occasional in storage and markets.
Pestalotia vaccinii (Shear) Guba, secondary leaf spot and storage rot. General.
Phacidium vaccinii Fr. var. *oxycocci* Dearn. & House, on leaves. N.Y.
Phomopsis vaccinii Shear: See *Diaporthe vaccinii.*
Phyllosticta putrefaciens Shear, berry rot, leaf spot Mass., N. J.
Physalospora obtusa (Schw.) Cke., secondary berry rot. Mass., N.J.
Pseudophacidium callunae Karst., on dead leaves and twigs. Oreg., Wash.
Psilocybe agrariella Atk. var. *vaccinii* Charles, fairy ring root rot. Mass., N.J.
Pucciniastrum myrtilli (Schum.) Arth. (II,III), rust. Oreg., Utah, Wash.
Ramularia multiplex Pk., leaf spot. Mich., N.Y., Wis. (1,2).
R. nigromaculans Shear: See *Mycosphaerella nigromaculans.*
Rhabdospora oxyocci Shear, on dead leaves. N.J.
Sclerotinia oxycocci Wor.: See *Monilinia oxycocci.*
Septoria sheareana Sacc. & Trott., on leaves and fruit. N.J.
Sphaeronema pomorum Shear, berry rot. N.J.
Sporonema oxycocci Shear, leaf spot and berry rot. Maine, Mass., N.J., Wis.; Oreg., Wash. (1); Alaska (2).
Strasseria oxycocci Shear, on leaves. Mass., N.J.
Synchytrium vaccinii Thomas, red leaf gall. N.J.
Valsa delicatula Cke. & Ell., on dead twigs. Mass., N.J., Oreg., Wash.
Venturia compacta Pk., leaf smudge. General (1,2).
False blossom—virus (*Chlorogenus vaccinii* Holmes, Vaccinium virus 1 K.M.Sm.). Maine to N.J. and Wis.; Oreg., Wash. (1,2).

V. Subgenus *Polycodium*, Deerberries

(1) *Vaccinium stamineum* L. Including several closely related species or geographic races, as *V. melanocarpum* C.Mohr and *V. neglectum* (Small) Fern. Range 23,24,25,26,27, 28,29,30.

Deciduous shrubs, sometimes grown in wild gardens for ornament; useful to wildlife.

Exobasidium vaccinii Wor., leaf and shoot gall. Md., N.Y.
Monilinia polycodii (Reade) Honey, twig blight, berry rot. N.Y.
Ophiodothella vaccinii Boyd, black-speckled leaf spot. Ga.
Pestalotia vaccinii (Shear) Guba, leaf spot. Miss.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Miss., W. Va.

Pucciniastrum myrtilli (Schum.) Arth. (II,III), rust. Pa.

Rhytisma vaccinii Schw. ex Fr., tar spot. N.Y. to Tenn. and Fla.

ERIOCAULACEAE

Eriocaulon, pipewort

Eriocaulon spp.

Rushlike perennial herbs in shallow water or bogs throughout the Eastern and Central States and southward; sometimes used in bog gardens; useful to wildlife.

Cladochytrium replicatum Karling, in cells of old leaves, ? leaf rot. N.Y.

Entophlyctis texana Karling, in cells of old leaves. Tex.

Tolyposporium eriocauli Clint., seed smut. Conn., Mass., N.H.

ERYTHROXYLACEAE

Erythroxylon

Erythroxylon spp.

Several shrubs or small trees of tropical America. *E. coca* Lam., coca, cocaineplant (not represented here) which is cultivated for cocaine in South America and the East Indies, is sometimes grown under glass in medicinal plant collections.

Bubakia erythroxylonis (Graz.) Cumm. (II,III), rust. P.R., V.I.

EUPHORBIACEAE

Acalypha

(1) *A. virginica* L., Virginia copperleaf, three-seeded mercury.
(2) *A. wilkesiana* Muell.-Arg., painted copperleaf.
(3) Other species.

Annual herb of woodlands in the Northeastern and Central States to Florida and Texas; shrub of southern Pacific Islands, grown for ornament as a conservatory plant and also in the open in the Far South; useful to wildlife.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on stems. T.H. (2,3).

Cephaleuros virescens Kunze, green scurf. P.R. (3).

Cercospora acalyphae Pk., leaf spot. N.Y. to Ala., Tex., and Wis. (1); Ala., N.Y., Okla., Tex. (3).

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (2).

Erysiphe cichoracearum DC., powdery mildew. Wis. (1).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meliola arecibensis F. L. Stevens, black mildew. P.R. (3).

Meloidogyne sp., root knot nematodes. Md. (1).

Phyllosticta sp., leaf spot. N.J. (2).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).

Physalospora abdita (Berk. & Curt.) N. E. Stevens, on stems. T.H. (2).

Plasmopara acalyphae G. W. Wils., downy mildew. Wis. (1).

Ramularia acalyphae Tharp, leaf spot. Tex. (3).

Rhizoctonia solani Kuehn, root rot. Ill. (2).

Rosellinia bunodes (Berk. & Br.) Sacc., on roots. P.R. (2).

Synchytrium aureum Schroet., leaf gall. Wis. (1).

Volutella acalyphae Atk., on stems. Ala.

Aleurites

(1) *A. fordii* Hemsl., tung-oil tree.
(2) *A. moluccana* Willd., candlenut.
(3) Other species.

Deciduous (1,3) or evergreen (2) trees of southeastern Asia: (1) is cultivated in the southern part of the Gulf States for oil used in paint and varnish; others are grown as ornamentals in subtropical regions.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., dieback, branch and trunk canker, nut rot. Ga., La. (1); T.H. (3). Also reported as *Dothiorella* sp.

Cephalosporium sp., collar girdle (?secondary). La.

Cercospora aleuritidis Miyake: SEE *Mycosphaerella aleuritidis*.

Clitocybe tabescens (Scop. ex Fr.) Bres., root and collar rot. Fla., La.

Colletotrichum sp. (*?gloeosporioides* Penz.), leaf spot. SEE *Glomerella*.

Corticium koleroga (Cke.) Hoehn.: SEE *Pellicularia koleroga*.

C. microsclerotia Weber: SEE *Pellicularia filamentosa*.

Diplodia spp.: SEE *Physalospora*.

Dothiorella sp.: SEE *Botryosphaeria*.

Fomes hawaiensis Lloyd, wood rot. T.H. (2).

Gloeosporium aleuriticum Sacc., leaf spot. Miss. (1). On nuts—T.H. (2).

Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose. Fla. (1,3).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Ala., Fla., Miss. (1).

Mycosphaerella aleuritidis Ou, leaf spot. General (1).

Nectria cinnabarina Tode ex Fr., on twigs, ? dieback. Mass. (3).

Pellicularia filamentosa (Pat.) Rogers, web blight. La., Miss. (1).

P. koleroga Cke., thread blight. La., Miss., N.C. (1); Fla. (1,3).

Phyllosticta sp., leaf spot. Fla., Ga. Probably spermatial stage of *Mycosphaerella aleuritidis*.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).

Physalospora rhodina (Berk. & Curt.) Cke., branch canker, dieback, nut rot. Fla., La., Miss., Tex. Also reported as *Diplodia natalensis* P.Evans.

Phytophthora cinnamomi Rands, root rot. La. (1).

Polyporus gilvus (Schw.) Fr., wood rot. T.H. (2).

Pseudomonas aleuritidis (McCul. & Demaree) Stapp, bacterial leaf spot. Ala., Ga., La. (1).

Sclerotium rolfsii Sacc. (=*Pellicularia rolfsii* (Curzi) E. West), seedling blight. Tex. (1).

Septobasidium pseudopedicellatum Burt, brown felt (on scale-infested branches). La. (1).
Trametes corrugata (Pers.) Bres., wood rot. T.H. (2).
Xylaria curta Fr. and *X. schweinitzii* Berk. & Curt., on dead wood. T.H. (2).
Ustulina deusta (Hoffm. ex Fr.) Petr. (*U. vulgaris* Tul.), wood rot. T.H. (2).
MINERAL DEFICIENCIES: copper-chlorosis, "cupping"; manganese — "frenching"; potassium-chlorosis and necrosis of leaf tips and edges; zinc-bronzing. Fla. (1).
ROUGH BARK—unidentified virus. La., Miss. (1).
WET WOOD (alcoholic slime flax)—cause unknown, perhaps frost cracks followed by bacterial infection. Fla. (1).
"WHITE SEED" (albinism)—genetic abnormality. Fla. (1).

Antidesma

A. bunias Spreng., China-laurel, bigney.

Small evergreen tree of southeastern Asia, grown for ornament and fruit in southern Florida and the West Indies.

Cephaleuros virescens Kunze, green scurf. Fla., P.R.

Bischofia

B. javanica Blume, toog.

Small tree of Pacific tropical islands, grown for ornament in warm regions.

Cephaleuros virescens Kunze, green scurf, algal spot. Fla.

Cnidoscolus, spurge-nettle

(1) *C. stimulosus* (Michx.) Engelm. & Gray
(2) *C. texanus* (Muell.-Arg.) Small, tread-softly.

Perennial herbs of the Southeastern and Gulf States; useful to wildlife.

Cercospora jatrophae Atk., leaf spot. Ala. (1).
C. jatrophicola (Speg.) Chupp—Tex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Septoria jatrophae Heald & Wolf, leaf spot. Ala. (1), Okla. (2), Tex. (1,2).
Uromyces agnatus Arth. (II,III), rust. Fla., S.C. (1). O and I unknown.
MOSAIC—unidentified virus. Tex. (1).

Codiaeum

C. variegatum Blume, croton (of florists).

Tropical shrubs grown for ornamental foliage as conservatory or house plants, and in the open in warm regions.

Gloeosporium spp., (=*Glomerella cingulata* (Ston.) Spauld. & Schrenk?), anthracnose. Fla., N.J.
Pellicularia koleroga Cke., thread blight. P.R.
Phyllosticta codiaei F.L.Stevens & E.Young, leaf spot. T.H.
P. codiaei Died. has priority.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Croton

(1) *C. capitatus* Michx.
(2) *C. monanthogynus* Michx.
(3) *C. texensis* (Klotzsch) Muell.-Arg.
(4) Other species.

Annual herbs (1,2,3) or shrubs (4), some evergreen, chiefly on dry plains in the Southeastern and Gulf States, also north and west; useful to wildlife.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on Ala., Ariz., and Nebr. (1,2,3); Calif., Fla., Tex. (4). O and I unknown.
Cercospora spp., leaf spot: *C. capitati* Tharp — Tex. (1); *C. crotonicola* Ell. & Barth.—Tex. (4); *C. crotonifolia* Cke.—S.C. (4); *C. crotonis* Ell. & Ev. —Ala., Fla., S.C., Tex. (1); Kans. (3); *C. crotonophila* Speg.—Wis. (4); *C. maritima* Tracy & Earle—Miss. (4); *C. tiglii* P.Henn.—P.R. (4).
Cuscuta indecora Choisy, dodder. Tex. (2).
Irenopsis crotonis (F.L.Stevens & Tehon) F.L.Stevens, black mildew. C.Z., P.R.
Phyllosticta portoricensis E.Young, leaf spot. P.R. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,3).

Drypetes

Drypetes spp., whitewood, Guiana-plum.

Small to medium trees of southern Florida and the West Indies.

Asterina drypetis Ryan, black mildew. P.R.
Meliola glabra Berk. & Curt., black mildew. P.R.
Phyllachora drypeticola F.L.Stevens & Dalbey, leaf spot. P.R.

Euphorbia

I. *Euphorbia pulcherrima* Willd., Poinsettia

Tropical American shrub, extensively grown for ornament, as a pot plant under glass in the North, and in the open in the Far South.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on stems. Tex.
Botrytis cinerea Pers. ex Fr., tip blight, stem canker. Mo., Tex., Wash., Alaska.
Cercospora pulcherrima Tharp (also var. *minor* Tharp), leaf spot. Tex.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Colletotrichum gloeosporioides Penz., on stems. Tex.
Corynebacterium poinsettiae Starr & Pirone, bacterial canker, leaf spot. Md., N.J., N.Y., Pa.
Fusarium sp., stem rot, wilt. Fla., N.J.
Gloeosporium intermedium var. *poinsettiae* Sacc., on stems. Calif., Ind.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. N.Y.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Phytophthora sp., stem rot, wilt. N.J.
Pythium debaryanum Hesse, stem rot. Okla.
P. perniciosum Serb., root rot. Calif.
P. ultimum Trow—Calif., N.J.
Rhizoctonia solani Kuehn, root rot. Fla., Ill., N.J., Tex.
Sclerotinia sclerotiorum (Lib.) dBy., stem rot. Wash.
Sphaceloma poinsettiae Jenkins & Ruehl, spot anthracnose. Fla., T.H.
Uromyces proëminens (DC.) Pass. var. *poinsettiae* (Tranz.) Arth. (O,I,II,III), rust. Okla., Tex., P.R.

II. Other Cultivated Species

(1) *Euphorbia corollata* L., flowering spurge.
(2) *E. cyparissias* L., cypress spurge.
(3) *E. heterophylla* L., painted spurge.
(4) *E. marginata* Pursh, snow-on-the-mountain.
(5) *E. milii* Desmoul. (*E. splendens* Bojer), crown-of-thorns.

Annual (3,4) or perennial (1,2) herbs, or shrub (5); native (1,3,4) or introduced from Europe and naturalized in the Eastern States (2); grown in gardens; (5) is a native of Africa, grown as a house or conservatory plant.

Alternaria sp. (*Macrosporium euphorbiae* Barth.), leaf spot. Kans., Tex. (4).
Botrytis cinerea Pers. ex Fr., gray-mold blight. N.J. (4).
Cercospora spp., leaf spot: *C. euphorbiae* Kell. & Swing.—Kans. (1); Tex. (1,2); *C. euphorbiicola* Atk.—Nebr. (4); *C. heterospora* Ell. & Ev.—Wis. (1); *C. pulcherrimae* Tharp—Okla. (4).
Cercosporidium fasciculatum (Cke. & Ell.) Hoehn., leaf mold. Iowa (1).
Cladosporium nervale Ell. & Dearn., on leaves. Wis. (1).
Diaporthe arctii (Lasch) Nits., on stems. Ga. (1).
Melampsora euphorbiae (Schubert) Cast. (O,I,II,III), rust. Maine to Pa., Ind., and Wis. (2).
Microsphaera euphorbiae (Pk.) Berk. & Curt., powdery mildew. Md. to Ga., Kans., and Mich. (1); Ind., Iowa, Kans., Mo. (4).
Phoma euphorbiicola (Schw.) Starb., on stems. Pa., Tex. (4).
Phyllosticta sp., leaf spot. Okla. (1), N.J. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,4), Ariz. (5).
Puccinia panici Diet. (O,I), rust. Ohio to Ala., Tex., and Minn. (1); Miss. to Tex., Colo., and S. Dak. (4). II and III on *Panicum virgatum*.
Stagonospora sp., leaf spot. Md. (5).
Tilletia euphorbiae L.Lenz, stem smut. La. (3).
Uromyces proëminens (DC.) Pass. (O,I,II,III), rust. Two varieties are segregated by Arthur: var. *myristica* (Berk. & Curt.) Arth.—Iowa and S. Dak. to Tex. and Colo. (4); var. *poinsettiae* (Tranz.) Arth.—Ind. to Fla., Tex., and Kans. (3).
Verticillium albo-atrum Reinke & Berth., wilt. N.J. (5).

III. Native Plants and Weeds

(1) *Euphorbia dentata* Michx., toothed spurge.
(2) *E. maculata* L., spotted spurge.
(3) *E. serpens* H.B.K., round-leaved spurge.
(4) *E. serpyllifolia* Pers., thyme-leaved spurge.
(5) Other species.

Mostly annual or a few perennial herbs, widely distributed, usually in waste ground but sometimes troublesome weeds in cultivated fields and lawns; several useful to wildlife.

Aecidium tithymali Arth. (O,I), rust. Ill., Ind., Iowa, Md., Nebr., N. Mex., Tex., Wis. (5).
Botrytis cinerea Pers. ex Fr., gray-mold blight. Conn. (1).
Cercospora euphorbiae Kell. & Swing., leaf spot. Tex. (1,2); Md. (5).
C. euphorbiicola Atk.—Ala. (5).
Cercosporidium fasciculatum (Cke. & Ell.) Hoehn., leaf and stem mold. N.C., to Ala., Tex., and Nebr. (2); Wis. (4); Kans., Md., N.J. (5). Variously reported as *Fusicladium* and *Scolecotrichum*, perhaps a *Cercospora*.
Cuscuta sp., dodder. N.J. (5).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Melampsora euphorbiae (Schub.) Cast. (O,I,II,III), rust. Calif., Iowa (5).
M. euphorbiae-gerardianae W.Muell. (II,III)—Ind., Md., Va., Wis., W. Va. (5). O and I unknown.
M. monticola Mains (II,III)—Nebr. to Tex., Calif., and Oreg. (5). O and I unknown.
Meloidogyne sp., root knot nematodes. Fla., T.H.
Microsphaera euphorbiae (Pk.) Berk. & Curt., powdery mildew. General (1,5).
Oidium cyparissiae Syd., powdery mildew. V.I. (5).
Peronospora spp., downy mildew. Mass. to Fla., Tex., and S. Dak. (2,3,4,5). Specific identities too confused to warrant definite records: Wilson has referred all American collections on hosts of the Chamaesyce section of Euphorbia to *P. chamaesycis* G.W.Wils. Gäumann distributes these among 2 European species, *P. euphorbiae* Fckl. and *P. cyparissias* d By., and one that is recorded only in America, *P. euphorbiae-glyptospermae* Gäum. In this country all reported hosts belong to the section Chamaesyce.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,3,5).
Puccinia panici Diet. (O,I), rust. Nebr., N.J. (5).
P. velata (Ell. & Ev.) Arth. (O,II,III). T.H. (5).
Rhizoctonia solani Kuehn, root rot. N.Y. (5).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Mich. (4).
Septoriopsis chamaesyceae F.L.Stevens & Dalbey, leaf spot. P.R. (2).
Tilletia euphorbii L.Lenz, stem smut. La. (2).
Uromyces dictyosperma Ell. & Ev. (O,I,II,III), rust. N. Dak. and Mont. to Tex.; Pacific Coast States (5).
U. occidentalis Diet. (O,I). Ariz., Colo., Mont., Nev., N. Mex., Utah (5). II and III on *Lupinus* spp. The correlated species, *U. coordinatus* Arth. (O,I, III) is reported in Calif. and Utah and *U. tranzschelii* Syd. (O,III), in Mont. to N. Mex. and Calif. (5, chiefly *E. robusta* Engelm.).
U. proëminens (DC.) Pass. (O,I,II,III). Three varieties are recognized: *U. proëminens euphorbiicola* (Tranz.) Arth. and *U. proëminens typica* Arth., both occurring on (2), (3), (4), and other spp. of the section Chamaesyce throughout the U. S. and in tropical America; the correlated *U. mayorii* Tranz. occurs on (3) and (5) from Kans. to Tex. and Calif. *U. proëminens poinsettiae* (Tranz.) Arth. occurs on (1) from Va. to Tex. and Utah.
Mosaic—undetermined virus. Iowa (2).

Gymnanthes

G. lucida Swartz, crabwood, poisonwood.

Small tree of southern Florida and the West Indies; wood sometimes used commercially.

Meliola gymnanthicola F.L.Stevens, black mildew. P.R.

Hevea

H. brasiliensis Muell.-Arg. (*Siphonia ridleyana* O.F.Cook), Para rubber tree (together with near relatives—geographic races or varieties).

Large tree of the Amazon region and northern part of South America; principal source of natural rubber. Plantation cultivation in North America, chiefly experimental, is carried on at

a few sites in Central America, and the tree is sometimes grown for novelty or ornament in southern Florida and the West Indies. Because of present interest in rubbertree cultivation, all available pathological records on Hevea for North and Central America are included here.

Alternaria sp., leaf spot. Mexico.
Cephaleuros virescens Kunze, green scurf, algal spot. Mexico, Panama.
Colletotrichum sp. and *C. gloeosporioides* Penz: SEE *Glomerella.*
Corticium salmonicolor Berk. & Br., pink disease. Mexico.
Diaporthe heveae Petch, on dead branches. Honduras.
Didymella sp., leaf spot. Mexico.
Diplodia sp., tapping-panel mold, also on stems and roots of seedlings following sunscald. Mexico.
D. theobromae (Pat.) Nowell: SEE *Physalospora rhodina.*
Dothidella ulei P.Henn., South American leaf disease. Costa Rica, Mexico, Panama.
Endoconidiophora fimbriata (Ell. & Halst.) Davidson, moldy rot of tapping panel. Mexico. A different physiological race from that commonly found on sweetpotato.
Fusarium sp., tapping-panel mold. Mexico.
Gloeosporium sp. (*?G. heveae* Petch): SEE *Glomerella.*
Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf spot, dieback. Fla., Mexico.
Guignardia heveae Frag. & Cif., on leaves. Dominican Republic. *G. heveae* Syd. has priority.
Helicobasidium sp., root rot of seedlings. Mexico.
Helminthosporium heveae Petch, bird's-eye spot. Fla., Honduras, Mexico, Nicaragua.
Ophiobolus heveae Petch, leaf spot. Fla., Haiti.
Periconia heveae Sevenson & Imle, leaf spot. Costa Rica, Mexico.
Phomopsis sp. (*P. heveae* (Petch) Boed.), on twigs, dieback. Fla., West Indies.
Phyllosticta sp., leaf spot. Mexico.
Physalospora rhodina (Berk. & Curt.) Cke., on dead branches, ?dieback. Costa Rica, Haiti, Honduras.
Phytophthora sp., dieback of budded shoots, trunk canker. Mexico.
Polyporus lignosus Klotzsch, white root rot. Mexico.
Rosellinia bunodes Berk. & Br., on roots, ? root rot. West Indies.
Sphaeropsis heveae Frag. & Cif., on branches, ?dieback. Dominican Republic.
Ustulina zonata (Lév.) Sacc. (=*U. deusta* (Hoffm. ex Fr.) Petr.?), root disease, collar rot. West Indies.

Hippomane

H. mancinella L., manchineel.

Tropical American tree noted for poisonous sap; wood used commercially.

Meliola hippomanae F.L.Stevens, black mildew. C.Z.

Hura

H. crepitans L., sandboxtree.

Tropical American tree, grown for ornament in southern Florida and the West Indies; also as a juvenile under glass.

Cercospora hurae F.L.Stevens, leaf spot. P.R.
Colletotrichum curvisetum F.L.Stevens, leaf spot. P.R.
Meliola hurae Syd., black mildew. C.Z.
Parodiopsis perae Arn., black mildew. C.Z.

Jatropha

(1) *J. curcas* L., physicnut.
(2) Other species.

Small trees or shrubs of tropical America, (including extreme southern United States), sometimes grown for ornament.

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1).
Colletotrichum gloeosporioides Penz., leaf spot. Fla. (1).
Meliola jatrophae F.L.Stevens, black mildew. (2).
Phakopsora jatrophicola (Arth.) Cumm. (II,III), rust. Tex., P.R., V.I. (1,2). O and I unknown.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
MOSAIC—unidentified virus. P.R. (2).

Mallotus

M. japonicus Muell. Arg.

Small tree of eastern Asia, sometimes grown for ornament in the Far South.

Cercospora malloti Ell. & Ev., leaf spot. Miss.

Manihot

(1) *M. esculenta* Crantz (*M. utilissima* Pohl), cassava, manioc.

Shrub of Brazil bearing tuberous edible roots, source of cassava and tapioca, for which it is extensively cultivated in tropical countries; sometimes grown for novelty in southern Florida.

(2) *M. carthaginensis* (Jacq.) Muell. Arg.

Small tree of Arizona and southern California.

Ascochyta carthaginensis Sacc., on twigs. S.C. (2).
Cercospora caribaea Cif. (*Ragnhildiana manihotis* F.L. Stevens & Solheim), white leaf spot. C.Z., P.R. (1). *C. henningsii* Allesch. (*C. cassavae* Ell. & Ev.), leaf spot. Fla., Tex., C.Z., P.R., T.H. (1).
Colletotrichum janiphae Grove, on twigs. S.C. (2).
Diplodia theobromae (Pat.) Nowell: SEE *Physalospora rhodina.*
Dothiorella votrya Sacc., on branches, ?dieback. S.C. (2). Conidial stage of *Botryosphaeria ribis?*
Fusarium solani (Mart.) Appel & Wr., tuber rot. P.R. (1).
Gloeosporium sp. (*?G. manihotis* P.Henn.), withertip; dieback. Fla., La., P.R., T.H. (1). Conidial stage of *Glomerella cingulata?*
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Ala., Fla., T.H. (1).
Microsphaera euphorbiae (Pk.) Berk. & Curt., powdery mildew. P.R. (1).
Periconia pycnospora Fres., secondary leaf spot. C.Z. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora abdita (Berk. & Curt.) N.E.Stevens, and *P. rhodina* (Berk. & Curt.) Cke., on branches, dieback, Fla. (1).
Phytophthora parasitica Dast., root rot. P.R. (1).
Rhizoctonia solani Kuehn, root rot. Fla., P.R. (1).
Rosellinia bunodes (Berk. & Br.) Sacc., and *R. pepo* Pat., root rot (? secondary). P.R. (1).
Uromyces janiphae (Wint.) Sacc. (O,I,II,III), rust. P.R. (1).

Phyllanthus

(1) *P. acidus* (L.) Skeels, gooseberry-tree.
Small tree of southeastern Asia, grown for edible fruit and locally naturalized in southern Florida and the West Indies.
(2) Other species.
Tropical shrubs or trees; grown for ornament.

Aecidium favaceum Arth. (O,I), rust. P.R. (2).
Cercospora phyllanthae Chupp, leaf spot. P.R. (2).
Phakopsora fenestrala Arth. (II,III), rust. C.Z., P.R. (1,2).

Ricinus

R. communis L., castorbean.
Shrub or small tree, perhaps originally of tropical Africa but now worldwide in warm regions; in temperate zones it is herbaceous and is grown as an annual for the seeds, which yield castor oil, and for ornament. Numerous varieties or races exist, sometimes segregated as species.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Used extensively as an experimental suspect, natural infection not specifically reported.
Alternaria sp., leaf spot. Fla., La., Tex. *A. brassicae* (Berk.) Sacc., on stems. N.Y. *A. compacta* (Cke.) McClellan, leaf spot. Md. *A. ricini* (Yoshii) Hansford, seedling blight, spot and rot of leaves and seed pods. Md.
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on stems, ?canker. Fla., T.H.
Botryotinia ricini (Godfrey) Whet., inflorescence blight. Ga. to Fla. and Tex., Md. Usually reported in the conidial stage as *Botrytis* sp.
Cercospora ricinella Sacc. & Berl. (*Cercosporina ricinella* (Sacc. & Berl.) Speg.), white leaf spot. Gulf States, Mo., Calif., P.R. *C. canescens* Ell. & Martin —Kans., Mo., N.J., P.R.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Didymella ricini Ell. & Ev., on stems. La.
Diplodia sp., on stems and seed pods. Fla., La., Tenn.
D. natalensis P.Evans. Ala. SEE ALSO *Physalospora*.
Fusarium sp., seedling blight (?secondary). Md. *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., on stems. La.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Heterosporium sp., on stems and seed pods. Calif.
Meloidogyne sp., root knot nematodes. Okla.
Phomopsis ricini Grove, on stems. S.C.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora spp., on stems: *P. abdita* (Berk. & Curt.) N.E.Stevens and *P. rhodina* (Berk. & Curt.) Cke. —Fla. *P. obtusa* (Schw.) Cke.—Ala.
Pseudomonas solanacearum E.F.Sm., bacterial wilt. Ala., Fla., Ga., Mich.
Phytophthora palmivora Butl., stem rot. T.H.
P. parasitica Dast. var. *nicotianae* Tucker—Fla., P.R.
Pythium spp., root rot. *P. intermedium* d By. and *P. ultimum* Trow—Calif.; *P. vexans* d By.—T.H.
Rhizoctonia solani Kuehn, seed rot, damping-off. Fla., Kans., Tex.
Schizophyllum commune Fr., on dead stems. Fla.
Sclerotinia ricini Godfrey: SEE *Botryotinia ricini*.
Sclerotium rolfsii Sacc., southern blight. Fla.

Sapium

S. sebiferum Roxb., Chinese tallowtree.
Small tree of China, grown for ornament and locally naturalized in the Gulf States.

Cercospora stillingiae Ell. & Ev., leaf spot. La.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Phyllosticta stillingiae Ell. & Ev., leaf spot. La.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Stillingia

(1) *S. sylvatica* L.
(2) *S. linearifolia* (Muell. Arg.) Small, queensdelight.
Perennial herbs of the Southeastern and Gulf States; sometimes grown for ornament or for the roots which are used medicinally.

Cercospora stillingiae Ell. & Ev., leaf spot. Tex. (2).
Cuscuta sp., dodder. Okla. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Uromyces graminicola Burr. (O,I), rust. Okla. (1). II and III on *Panicum* spp.

Tragia

Tragia spp.
Perennial herbs of waste ground in the Southern States; useful to wildlife.

Cercospora euphorbiicola Atk. var. *tragia* Tharp, leaf spot. Tex.
Cuscuta sp., dodder. Tex. *C. coryli* Engelm.—Okla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Sclerotium sp., stem rot. Tex.

FAGACEAE

Castanea, chestnut

I. Native Species

(1) *Castanea dentata* (Marsh.) Borkh., American chestnut. Range 24,25,26,27,28,29,30.
Large tree, formerly important for timber and nuts, now nearly exterminated throughout most of its range by Endothia blight.
(2) *C. pumila* (L.) Mill., *C. alabamense* Ashe, and *C. ozarkensis* Ashe, chinquapin. Range 25,27,28,29,30.
Mostly small to medium-sized trees in several geographic races, useful to wildlife.

Actinopelte dryina (Sacc.) Hoehn., leaf spot. Fla., Miss., N.J. (1); Ala. (2).
Aleurodiscus acerinus (Pers. ex Fr.) Hoehn. & Litsch., bark patch. Mich. (1).
Anthostoma dryophilum (Curr.) Sacc., on dead branches. Ga., Va. (1).
Armillaria mellea Vahl ex Fr., root and butt rot. N.C., N.J., N.Y., Tenn., Va. (1); Va. to Ala., Ark., and Mo. (2).
Asconidium castaneae Seaver, on dead branches. Pa. (1). SEE ALSO *Pezicula purpurascens*.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on twigs. Miss., Ohio (1).
B. castaneae (Schw. ex Fr.) Sacc.—N.C. (1).
Cenangium castaneae Schw., on twigs. Pa. (1).
C. albo-atrum Ell. & Ev.—W. Va. (1).
Ceratostomella microspora Davidson, on dead wood. Pa. (1). *C. microspora* Ell. & Ev. has priority.
Chlorociboria aeruginosa (Oed. ex Fr.) Seaver (*Chlorosplenium aeruginosum* (Fr.) de N., on dead wood, green stain. General (1).
C. versiformis (Pers. ex Fr.) Seaver—Ga. (1).
Chlorosplenium chlora (Schw. ex Fr.) Mass., on dead wood. Ga., Tenn. (1).
Clasterosporium sigmoideum Ell. & Ev., on dead branches. W. Va. (1).
Clitocybe illudens Schw., on decaying stumps, sapwood rot. General (1).
C. monadelpha Morg.—Va. (1).
Colpoma quercinum (Pers. ex Fr.) Wallr., on dead twigs. Ga. (1).
Coniophora puteana (Schum. ex Fr.) Karst., wood rot, chiefly of slash, sometimes of timber. Occasional (1).
Corticium caeruleum Schrad. ex Fr., wood rot of dead branches and trunks. Ala., Tenn. (1). Numerous other species reported on rotting wood, chiefly small branches.
Coryneum spp., on twigs and dead branches: *C. castanicola* Berk. and Curt.—Fla., Oreg.; *C. pustulatum* Pk.—Iowa, N.Y., Ohio, W. Va. (1).
C. kunzei Cda. var. *castaneae* Sacc. & Roum.: See *Melanconis modonia.*
Cronartium cerebrum Hedgc. & Long (=*C. quercuum* (Berk.) Miyabe?) (III), rust. Md. (1,2), N.C. (1). O and I on 2- and 3-needle pines.
Cryptodiaporthe castanea (Tul.) Wehm., twig canker. Ohio (1).
Cryptospora cinctula (Cke. & Pk.) Sacc., on dead branches. N.Y. to Va. (1); Ga. (2).
Cryptosporium epiphyllum Ell. & Ev.: See *Marssonina ochroleuca.*
Cylindrosporium castaneae (Lév.) Krenner (*C. castaneicolum* (Desm.) Berl.), leaf spot. N.J., Pa. (1). Reputed to be a conidial stage of *Mycosphaerella maculiformis* but not confirmed.
Cytospora spp., on twigs and branches. In part conidial stage of saprophytic *Valsa* spp., or of *Cryptodiaporthe,* q.v.
Cytosporella carnea Ell. & Ev., on dead branches. Va., W. Va.
Daedalea quercina L. ex Fr., brown cubical heart rot of dead trunks and timber. Mass. to Va. and Ind. (1).
D. confragosa Bolt. ex Fr. and *D. unicolor* Bull. ex Fr., on dead wood. Va. (1).
Dermatea purpurascens Ell. & Ev.: See *Pezicula purpurascens.*
Diaporthe eres Nits. (*D. castaneti* Nits.), on dead branches. N.Y. (1).
Didymella castanella (Cke. & Ell.) Sacc., on dead twigs. N.J. (1).
Diplodia longispora Cke. & Ell., twig blight. N.J., N.Y. (1).
Discohainesia oenotherae (Cke. & Ell.) Nannf., on fallen leaves. Md., Va. (1,2).
Discosia artocreas Tode ex Fr., on fallen leaves. W. Va. (1).
Endothia parasitica (Murr.) P.J. & H.W.Anderson, blight, canker. Throughout the natural range of American chestnut, also rarely in planted chestnuts in Calif., Oreg., and Wash. but eradication apparently effected there; occasional on chinquapin, Mass. to Ga. and Iowa.
E. gyrosa (Schw.) Fr. on exposed roots and dead branches. Pa. to Ga. and Ala. (1).
E. radicalis (Schw. ex Fr.) Wint. (*E. fluens* Sow. ex Shear & N.E.Stevens)—Pa. to S.C., Miss., and Ohio (1); Ark. (2).
Favolus alveolaris (DC. ex Fr.) Quél. (*F. canadensis* Klotzsch), wood rot, chiefly of small branches. Occasional (1).
Fenestella castanicola (Berk. & Curt.) Sacc., on dead branches. Va. (1).
F. phaeospora Sacc.—N.J., Wash. (1).
Fistulina hepatica Huds. ex Fr., base of dead trunks and stumps, brown heart. Conn. to Va. and Tenn. (1).
F. pallida Berk. & Rav.—Pa. (1).
Flammula sp., on decaying stumps and slash. N.Y., Va. (1).
Fomes spp., various wood rots, usually on trunks and logs, sometimes on living trees:
F. annosus (Fr.) Cke., root and butt rot. Mich. (1).
F. applanatus (Pers. ex Wallr.) Gill., butt rot or on stumps. Va. (1).
F. everhartii (Ell. & Gall.) Schrenk, white spongy heart rot. Ind., Mich. (1).
F. ohiensis (Berk.) Murr.—Md., Va., W. Va. (1).
F. pinicola (Sw. ex Fr.) Cke., brown crumbly heart rot. Pa. (1).
F. scutellatus (Schw.) Cke.—Md., Va., W. Va. (1).
Fusicoccum castaneum Sacc.: See *Cryptodiaporthe castanea.*
Gloeosporium ochroleucum (Berk. & Curt.) Ell. & Ev.: See *Marssonina ochroleuca.*
Gnomonia setacea (Pers. ex Fr.) Ces. & de N., on fallen leaves. Ga. (1,2).
Hymenochaete rubiginosa (Schrad. ex Fr.) Lév., white pocket rot of dead trunks and timber. Md., N.Y., Tenn., Va. (1). Other species occasionally reported on decaying wood: *H. corrugata* (Fr.) Lév., *H. episphaeria* (Schw.) Mass., *H. tabacina* (Sow. ex Fr.) Lév.
Hypholoma sublateritium Fr., on dead wood, usually roots and stumps. General.
Hypoxylon spp., on dead wood; the following commonly reported: *H. fuscum* Pers. ex Fr., *H. howieanum* Pk., *H. punctulatum* (Berk. & Rav.) Cke., *H. rubiginosum* Pers. ex Fr.
Laestadia castanicola Ell. & Ev., on dead leaves. N.J. (1).
Lenzites betulina L. ex Fr., and *L. trabea* Pers. ex Fr., brown cubical rot of dead trunks and timber. Cosmopolitan (1,2).
Leptothyrium castaneae (Spreng.) Sacc., on fallen leaves, ?leaf spot. Fla., W. Va. (1).
L. castanicola Ell. & Ev.: See *Actinopelte dryina.*
Marssonina ochroleuca (Berk. & Curt. ex Pk.) Lentz, brown-bordered leaf spot, eyespot. General (1,2).
Melanconis modonia Tul., on branches, ?canker. N.Y. to Va. and Ind., also Calif., Oreg. (1). Usually reported in the conidial stage as *Coryneum kunzei* var. *castaneae.*
Melanconium cinctum Berk. & Curt., on twigs. Ga., Tenn. (1); N.C. (2).
Merulius fugax Fr., on decaying wood. Pa., Tenn. (1).
M. tremellosus Schrad. ex Fr.—Va. (1).
Microsphaerea alni DC. ex Wint., powdery mildew. Mass. to N.C. and Ohio (1); N.C., Va. (2).
Monochaetia desmazierii Sacc., leaf spot. Ga., Ind., N.C., Tenn., Va., W. Va. (1); Ala., N.C. (2).
M. pachyspora Bub. (*Hyaloceras pachysporum* Bub.)—Fla., N.C. (1).
Mycosphaerella maculiformis (Pers. ex Fr.) Schroet., on fading or fallen leaves. N.Y., Pa., W. Va. (1).
M. punctiformis (Pers. ex Fr.) Schroet.—Md. (1).
Myxosporium castaneum Pk., on dead branches. N.Y. (1).
Odontia fimbriata Pers ex Fr., and *O. fusco-atra* (Fr.) Bres., on dead wood. Occasional.
Panus rudis Fr., and *P. stipticus* Fr., sapwood rot of dead sprouts and slash. General (1).

Peniophora spp., wood rot chiefly of fallen branches and slash, occasionally of logs; the following commonly reported: *P. cinerea* (Pers. ex Fr.) Cke., *P. filamentosa* (Berk. & Curt.) Burt, *P. velutina* (DC. ex Fr.) Cke., and others.

Pezicula purpurascens (Ell. & Ev.) Seaver, on dead branches. Mass., Pa., Va. (1).

Pezizella oenotherae (Cke. & Ell.) Sacc., on fallen leaves. Md., Va.

Pholiota adiposa Fr. and *P. squarrosa* Fr., on decaying logs and stumps. N.Y., Wis. (1).

Phoma castanea Pk., on dead branches. N.Y., Pa., Va. (1).

Phoradendron flavescens (Pursh) Nutt., mistletoe. ?Ind.

Phyllactinia corylea Pers. ex Karst., powdery mildew. N.Y. to Ga. and Ind.

Phyllosticta castanea Ell. & Ev., leaf spot. N.Y. to N.C. and W. Va. (1); W. Va. (2).

P. fusispora Ell. & Ev.—Ala., Tex. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).

Physalospora obtusa (Schw.) Cke., on twigs, ?dieback. Ohio (1).

Phytophthora cinnamomi Rands, root and collar rot of nursery plants and forest trees. Pa. to Ga., La., and Ark., locally in Okla. and Mo. (1,2).

Pleurotus ostreatus Fr., sapwood or sometimes heart rot of dead trunks. Southern Appalachians. (1).

Polyporus spp., various wood rots; distribution more or less general with host unless otherwise stated. Species often on living trees causing butt and heart rots: *P. berkeleyi* Fr.; *P. croceus* Pers. ex Fr. (*P. pilotae* Schw.), white pocket heart rot (1,2); *P. frondosus* Dicks. ex Fr., white spongy butt rot; *P. spraguei* Berk. & Curt. and *P. sulphureus* Bull. ex Fr., brown cubical heart rot. Species on dead trunks and slash, or sometimes wound rots: *P. adustus* Willd. ex Fr., *P. albellus* Pk., *P. biformis* Klotzsch, *P. cinnabarinus* Jacq. ex Fr., *P. galactinus* Berk., *P. gilvus* (Schw.) Fr., *P. glomeratus* Pk., *P. hirsutus* Wulf. ex Fr., *P. pargamenus* Fr., *P. pocula* (*poculum*) (Schw.) Berk. & Curt., *P. pubescens* Schum. ex Fr., *P. rutilans* Pers. ex Fr., *P. spumeus* Sow. ex Fr., *P. tulipiferus* (Schw.) Overh., *P. umbellatus* Pers. ex Fr., *P. versicolor* L. ex Fr.

Poria spp., wood rot, usually of logs, slash, or timber; cosmopolitan distribution: *P. eupora* (Karst.) Cke.; *P. ferruginosa* (Schrad. ex Fr.) Karst.; *P. mutans* Pk., white pocket heart rot; *P. pulchella* (Schw.) Cke.; *P. punctata* (Fr.) Cke.; *P. subacida* (Pk.) Sacc.; *P. tenuis* (Schw.) Cke.; *P. unita* (Pers.) Cke.; *P. versipora* Pers. ex Rom.

Radulum orbiculare Fr., on decaying wood. Cosmopolitan.

Rutstroemia americana (Durand) White, on fallen burs. N.Y., Pa. (1).

Schizophyllum commune Fr., sapwood rot of dead sprouts and slash. Cosmopolitan.

Scolecosporium fagi Lib., leaf spot. Fla. (1).

Septoria ochroleuca Berk. & Curt.: SEE *Marssonina ochroleuca*.

Sphaerognomonia carpinea (Fr.) Poteb., on fallen leaves. Ga. (1).

Steccherinum adustum (Schw.) Banker, and *S. ochraceum* (Pers. ex Fr.) S.F.Gray, sapwood rot of dead trunks and branches. General (1).

Stereum spp., various wood rots, distribution more or less general with host. *S. gausapatum* Fr. and *S. frustulosum* Pers. ex Fr. may cause a white pocket heart rot of living trees (1,2). Others commonly reported on dead trunks, stumps, and slash: *S. albobadium* (Schw.) Fr., *S. fasciatum* Schw., *S. fuscum* Schrad. ex Quél., *S. hirsutum* Willd. ex Fr., *S. ochraceo-flavum* Schw., *S. purpureum* Pers. ex Fr., *S. rameale* Schw., *S. sericeum* Schw., *S. umbrinum* Berk. & Curt., *S. versiforme* Berk. & Curt.

Strumella coryneoidea Sacc. & Wint., branch and trunk canker. Conn., Pa. (1). A connection with the ascomycete, *Urnula craterium* (Schw.) Fr., has been shown.

Trametes sepium Berk., wood rot, chiefly of timber, Cosmopolitan (1).

Xylaria hypoxylon (L. ex Fr.) Grev., on dead wood, Cosmopolitan (1).

MOSAIC (variegation)—suspected virus. N.Y. (1).

II. Cultivated Species

(1) *Castanea crenata* Sieb. & Zucc., Japanese chestnut.

(2) *C. mollissima* Blume, Chinese chestnut.

(3) *C. sativa* Mill., Spanish chestnut.

Asiatic or European species: (1) and (2) introduced for hybridizing with American chestnuts because of their resistance to Endothia blight; (3) formerly grown for edible nuts in the Middle Atlantic and Southern States but eliminated by blight and now cultivated only in the Pacific Coast States.

Actinopelte dryina (Sacc.) Hoehn., leaf spot. Miss., N.J. (3).

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., twig blight. Miss., Va. (1).

Cronartium cerebrum Hedgc. & Long (II,III), rust. Experimental infection reported (2,3).

Cryptodiaporthe castanea (Tul.) Wehm. (*Fusicoccum castaneum* Sacc.), canker, dieback. Maine to Ala., Iowa, and Mich., also Calif., Oreg. (1,2); Md. (3).

Cytospora sp., twig blight. Wash. (2).

Daedalea quercina L. ex Fr., heart rot. Pa. (1).

Diplodia sp., twig blight. Oreg., Tenn. (2).

Discohainesia oenotherae (Cke. & Ell.) Nannf., on leaves. Ga. (2).

Endothia parasitica (Murr.) P.J. & H.W.Anderson, blight, canker. N.Y., Pa. (1,2—resistant); general on (3) where grown in the East, localized in Calif., Oreg., and Wash. (3).

Exosporium fawcettii E.E.Wils., canker, dieback. Calif. (3).

Gloeosporium sp., blossom-end rot of nuts. Ga. (2).

Laestadia orientalis Ell. & Ev., on fallen leaves. La. (1).

Marssonina ochroleuca (Berk. & Curt. ex Pk.) Lentz, anthracnose, leaf spot. Md. (2), Mass. to S.C. (3).

Melanconis modonia Tul. (*Coryneum kunzei* Cda var. *castaneae* Sacc. & Roum.), twig blight. Oreg. (3).

Microsphaera alni DC. ex Wint., powdery mildew. Mass., N.C. (3).

Myxosporium sp., on twigs. Oreg. (1).

Phomopsis sp., twig blight. Md., Va. (1,2).

Phyllactinia corylea Pers. ex Karst., powdery mildew. Ohio (3).

Phyllosticta castanea Ell. & Ev., leaf spot. Tex. (3).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).

Phytophthora cinnamomi Rands, root and collar rot of seedlings. Ga., La. (3), also (1,2—resistant).

Polyporus spp., sapwood rot, sometimes heart rot; the following commonly reported: *P. cinnabarinus* Jacq. ex Fr., *P. gilvus* (Schw.) Fr., *P. hirsutus* Wulf. ex Fr., *P. nidulans* Fr., *P. pargamenus* Fr., *P. tulipiferus* (Schw.) Overh., *P. versicolor* L. ex Fr. (*).

Schizophyllum commune Fr., sapwood rot. Oreg. (3).

Septoria gilletiana Sacc., leaf spot. Ga., La. (1,2).

Stereum gausapatum Fr., heart rot. Md. (2). *S. hirstutum* Willd. ex Fr.—Oreg. (*). *S. versiforme* Berk. & Curt.—Md. (3).

Castanopsis, chinquapin

(1) *C. chrysophylla* (Dougl. ex Hook.) DC., golden chinquapin. Range 1,4,6.
(2) Other species.

Evergreen shrubs or small trees of the Pacific coast; wood of (1) used commercially; cultivated, zone 7; useful to wildlife.

Armillaria mellea Vahl ex Fr., root rot. Oreg. (1).
Botryosphaeria sp., on twigs. Fla. (2).
Coryneum sp. (=*Melanconis modonia* Tul.?), on twigs. Ga. (2).
Dothidella castanopsidis Dearn., leaf spot. Calif., (1,2); Oreg. (1).
Endothia parasitica (Murr.) P.J. & H.W.Anderson, blight, canker. General in Eastern U.S., localized and presumably eradicated in Pacific Coast States (3).
Fomes igniarius (L. ex Fr.) Kickx, heart rot. Oreg. (1).
Ganoderma oregonense Murr., root and butt rot. Oreg. (1).
Gloeosporium castanopsidis Dearn. & House, on leaves. Calif. (1).
Godronia castanopsidis Seaver, on dead branches. Calif. (1).
Melanconium cinctum Berk. & Curt., on twigs, ?canker. Ga. (2).
Microsphaera alni DC. ex Wint., powdery mildew. N.C.
?Mycosphaerella sp. (*Sphaerella weiriana* Sacc.), leaf spot. Calif., Oreg. (1).
Peniophora sanguinea (Fr.) Bres., wood rot. Oreg. (1).
Pezicula cinnamomea (DC.) Sacc., on dead twigs. Oreg. (1).
Polyporus hirsutus Wulf. ex Fr., and *P. versicolor* L. ex Fr., sapwood rot. Oreg., Wash. (1).
Poria ferrea (Pers.) Bourd. & Galz., wood rot. Calif. (1).
Septobasidium pseudopedicellatum Burt, brown felt on scale-infested branches. Ga. (2).
Sphaerulina myriadea (DC. ex Auers.) Sacc., on leaves. Calif. (1).
Taphrina castanopsidis Ell. & Ev. ex Jenkins, leaf blister. Calif. (1).
Valsa coronata Hoffm. ex Fr., on twigs. Oreg. (1).

Fagus

(1) *F. grandifolia* Ehrh., American beech. Range 20,22,23,24,26,27,28,29,30; cultivated, zone 3. Large forest tree, wood used commercially; useful to wildlife.
(2) *F. sylvatica* L. European beech. Cultivated in numerous forms differing in habit and leaf color, zone 4.
(3) Other species, chiefly Oriental; cultivated.

Anthostoma turgidum (Pers. ex Fr.) Nits., on dead branches. Md., N.Y.
Armillaria mellea Vahl ex Fr., root rot. Conn., N.J., N.Y., Ohio (1,2).
Botryosphaeria hoffmanni (G.Kunze) Hoehn., on twigs, ?canker. Mass., Md., Mich., N.J., Pa. (1).
Ceratostomella echinella Ell. & Ev., on dead branches. Tex. (1).
C. microspora Ell. & Ev.—N.Y. (1).
Cercospora sp., leaf spot. N.Y. (1).
Coccomyces comitialis (Batsch ex Fr.) Dearn. & House, on fallen leaves. N.Y. (1).
C. coronatus (Schum. ex Fr.) de N.—reported in N.Y. (1); probably general.
Coniothyrium fagi Tehon, on leaves. Ill. (1).
Conopholis americana (L.) Wallr., parasitic on roots. General (1).
Cryptodiaporthe galericulata (Tul.) Wehm., on branches. Mich., N.Y. (1).
Cryptosporella compta (Tul.) Sacc., on branches. W. Va. (1).
Cylindrocarpon album (Sacc.) Wr. var. *majus* Wr.: SEE *Nectria coccinea* var. *faginata*.
Cytospora spp., on twigs, ?canker, ?dieback. Conn., N.J. (1). Conidial stage of *Valsa* spp. (q.v.).
C. pustulata Sacc. & Roum.—Mich., Vt. (1).
Daedalea spp., on dead trunks, stumps, and branches, or sometimes wound rot of living trees, the following commonly reported:
D. ambigua Berk.—Ohio (1).
D. confragosa Bolt. ex Fr.—N.C., N.Y. (1).
D. quercina L. ex Fr., brown cubical heart rot. Maine to Va. and Ohio (1).
D. unicolor Bull. ex Fr.—Md., Ind., N.H., Vt. (1).
Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., sapwood rot of stumps and logs. Maine (1).
D. vernicosa (Schw.) Ces. & de N.—Mass., Md., W. Va., Wis. (1).
Diaporthe fagi Wehm., on dead branches. Maine, N.Y. (1); also var. *longispora* Wehm.—Mich. (1).
Diatrype spp. (commonly *D. disciformis* Hoffm. ex Fr., and *D. virescens* (Schw.) Curt., and others), on dead branches. Maine to Ala., Ind., and Mich. (1).
Dichaena faginea Pers. ex Fr., on bark of trunk and branches. Maine to Ala. and Ohio (1).
Discosia artocreas Tode ex Fr., on fallen leaves. Ala., Mass., N.Y. (1).
Endobotrya legans Berk. & Curt., on dead twigs. Maine, Mass. (1).
Endoconidiophora virescens Davidson, green stain of sapwood. Va. (1).
Endothia gyrosa (Schw.) Fr., on bark of exposed roots. N.Y. to Ga. and Ohio (1); Md. (2).
Epifagus virginiana (L.) Bart., beechdrops, cancer-root. General (1).
Favolus alveolaris (DC. ex Fr.) Quél., on decaying wood. Cosmopolitan.
Fomes spp., butt rot or heart rot of living trees:
F. applanatus (Pers. ex Wallr.) Gill., white-mottled heart rot. Maine to Va. and Wis. (1).
F. connatus (Weinm. ex Fr.) Gill., white spongy butt rot. Conn., Mich., Wis. (1).
F. everhartii (Ell. & Gall.) Schrenk, white flaky heart rot. N.J., N.Y. (1).
F. fomentarius (L. ex Fr.) Kickx, yellow spongy sapwood and heart rot. Maine to Tenn. and Ohio (1).
F. igniarius (L. ex Fr.) Kickx, white spongy heart rot. New England, N.Y., Wis. Var. *laevigatus* (Fr.) Overh.—Lower Mississippi Valley (1).
F. pinicola (Sw. ex Fr.) Cke., brown crumbly heart rot. N.Y., Tenn., Vt. (1).
Fomes spp., on dead wood: *F. conchatus* (Pers. ex Fr.) Gill.—Maine; *F. fraxinophilus* (Pk.) Sacc.—Conn.; *F. ohiensis* (Berk.) Murr.—Ind., Pa.; *F. roseus* (Alb. & Schw. ex Fr.) Cke.—N.Y.
Gloeosporium fagi (Desm. & Rob.) West., leaf spot. Conn. to N.J. and Wis.; ?Tex. (1). *G. fagicola* Pass. (doubtfully distinct)—N.Y. (1).
Graphium album (Cda.) Sacc., sapwood stain. Ark. (1).
Hericium coralloides (Scop. ex Fr.) S.F.Gray, *H. erinaceus* (Bull. ex Fr.) Pers., and *H. laciniatum* Leers ex Banker, white spongy sapwood rot, usually on dead trunks, sometimes on living trees. Maine, N.Y., Vt., W. Va. (1).
Hymenochaete spp., on dead wood, usually fallen branches; the following commonly reported: *H. cinnamomea* (Pers.) Bres., *H. corrugata* (Fr.) Lév., *H. tabacina* (Sow. ex Fr.) Lév.
Hypoxylon spp., on dead wood, the following commonly

reported: *H. atropunctatum* (Schw. ex Fr.) Cke., *H. fragiforme* (Pers. ex Fr.) Kickx, *H. cohaerens* Pers. ex Fr., *H. howieanum* Pk., *H. rubiginosum* Pers. ex Fr.

Lasiosphaeria pezizula (Berk. & Curt.) Sacc., sapwood stain. Ill. (1).

Lentinus vulpinus Fr., on dead wood. Occasional.

Lenzites betulina L. ex Fr., wood rot, usually of logs and stumps. Cosmopolitan.

L. trabea Pers. ex Fr., dry rot of timber. Occasional.

Libertella faginea Desm., on dead twigs. Maine to W. Va. and Mich. (1).

Massaria macrospora (Desm.) Sacc. (*?Asterosporium hoffmanni* G.Kunze), on twigs. Mass. (2).

Microsphaera alni DC. ex Wint., powdery mildew. Mass. to Ala. and Wis. (1). Includes *M. erineophila* Pk., occurring on erinea (q.v.), sometimes reported as distinct.

Microstroma sp. (*?M. album* (Desm.) Sacc.), leaf spot. Ill., N.J. (1).

Mycosphaerella fagi (Auers.) Lindau, on leaves. Maine (1).

M. punctiformis (Pers. ex Fr.) Schroet., on fallen leaves. Mass., N.Y. (1).

Nectria cinnabarina Tode ex Fr., on twigs, ?dieback. New England to Va. (1); Mass. (2).

N. coccinea Pers. ex Fr. var. *faginata* Lohman et al., canker associated with scale insect (*Cryptococcus fagi*) infestation. Maine, N.H. (1).

N. galligena Bres., trunk canker. Maine (1).

Nummularia clypeus (Schw.) Cke. (*N. bulliardii* Amer. auths. not Tul.) on dead branches. Ind., N.Y., Ohio.

Peniophora spp., on dead fallen branches, of minor importance in slash decay; the following commonly reported: *P. cinerea* (Pers. ex Fr.) Cke., *P. filamentosa* (Berk. & Curt.) Burt, *P. incarnata* (Pers. ex Fr.) Karst., *P. velutina* (DC. ex Fr.) Cke.

Pholiota spp. (*P. adiposa* Fr., *P. squarrosoides* Pk., and others), wood rot of stumps and logs. Occasional.

Phomopsis sp., dieback. Mich., N.Y., Pa. (1,2).

Phoradendron flavescens (Pursh) Nutt., mistletoe. Occasional, Va. to Ind. and southward (1).

Phyllactinia corylea Pers. ex Karst., powdery mildew. New England to Ala., Ill., and Wis. (1).

Phyllosticta faginea Pk., leaf spot. N.Y. to Md., Mo., and Wis. (1).

Phytophthora cactorum (Leb. & Cohn) Schroet., bleeding canker. Mass., N.Y., R.I. (1,2).

Pleurotus spp. (*P. sapidus* Kalchbr., *P. serotinus* Fr., and others), wood rot of logs and stumps. Occasional.

Polyporus spp., butt rot or heart rot of living trees: *P. glomeratus* Pk.—New England, N.Y., Ind.; *P. obtusa* Berk.—Md.; *P. rheades* (Pers.) Fr.—Mich., Ohio; *P. spraguei* Berk. & Curt.—Ind., Mo., Ohio; *P. squamosus* Huds. ex Fr. var. *fagicola* (Murr.) Graff—Maine, N.Y.

Polyporus spp., on dead trunks, logs, and stumps, sometimes wound rot of living trees; distribution general or as indicated: *P. adustus* Willd. ex Fr.; *P. albellus* Pk.; *P. biformis* Klotzsch; *P. cinnabarinus* Jacq. ex Fr.; *P. cuticularis* Bull. ex Fr.; *P. delectans* Pk.—N.Y., Ohio; *P. dichrous* Fr.; *P. graveolens* (Schw.) Fr.—Ohio; *P. elegans* Bull. ex Fr.; *P. gilvus* (Schw.) Fr.—Md. to Miss., La., and Ind.; *P. hirsutus* Wulf. ex Fr.; *P. hispidus* Bull. ex Fr.—Conn.; *P. pargamenus* Fr.; *P. pubescens* Schum. ex Fr.; *P. radiatus* Sow. ex Fr.—Maine, N.Y.; *P. resinosus* Schrad. ex Fr.—Ind., N.Y., Vt.; *P. semipileatus* Pk.—N.H., N.Y.; *P. spumeus* Sow. ex Fr.—N.Y.; *P. tulipiferus* Schw. Overh.; *P. versicolor* L. ex Fr.

Poria spp., various wood rots, usually of dead trunks and logs, rarely heart rot of living trees; reported distribution chiefly N.Y. to Ind. and Mich.: *P. aestivale* Overh., *P. ambigua* Bres., *P. canescens* Karst., *P. ferruginosa* (Schrad. ex Fr.) Karst., *P. nigrescens* Bres., *P. obliqua* (Pers. ex Fr.) Bres., *P. punctata* (Fr.) Cke., *P. semitincta* (Pk.) Cke., *P. tenuis* (Schw.) Cke., *P. unita* (Pers.) Cke., *P. versipora* Pers. ex Rom.

Schizophyllum commune Fr., wood rot of dead trunks. Cosmopolitan.

Scorias spongiosa (Schw.) Fr., sooty mold on leaves and twigs following aphid or scale infestation. Mass. to Ala. and Mo. (1).

Septobasidium spp., brown felt on scale-infested twigs: *S. cokeri* Couch—Fla., N.C.; *S. curtisii* (Berk. & Desm.) Boed. & Steinm.—N.C. (1).

Steccherinum ochraceum (Pers. ex Fr.) S.F.Gray, white spongy rot of dead trunks. Maine, N.Y. (1).

S. septentrionale (Fr.) Banker—Ind., Mich., Vt. (1).

Stereum spp., various wood rots, usually of dead trunks and branches, rarely heart rot of living trees (1): *S. fasciatum* Schw.—Ind., Ohio, Pa., Vt.; *S. fuscum* Schrad. ex Quél.—N.Y., Ohio; *S. hirsutum* Willd. ex Fr.—Ind.; *S. murraii* (*murrayi*) (Berk. & Curt.) Burt—N.Y., Vt.; *S. purpureum* Pers. ex Fr.—Maine, Vt.; *S. rameale* Schw.—Ind., Maine, Md.; *S. umbrinum* Berk. & Curt.—N.H.

Strumella coryneoidea Sacc. & Wint. (=*Urnula craterium* (Schw.) Fr.?), trunk canker. New England to Md. (1).

Trametes spp., wood rot of dead trunks and branches: *T. mollis* (Sommerf.) Fr.—N.H., N.Y.; *T. sepium* Berk.—Vt., W. Va.; *T. tenuis* Karst. (=*T. isabellina* Fr.?)—Pa.

Ustulina deusta (Hoffm. ex Fr.) Petr. (*U. vulgaris* Tul.), sapwood rot, ?trunk canker. Ga., Maine, N.Y., R.I., Va. (1).

U. linearis Rehm—Ky.

Valsa spp., on dead branches: *V. ambiens* Pers. ex Fr.—Vt.; *V. fagicola* Ell.—Pa.

Xylaria corniformis Fr., on dead wood. W. Va.

X. digitata L. ex Fr.—Vt. (1).

ERINEUM—leaf deformity caused by mites (*Eriophyes* sp.). Ill., Ind., La., N.Y., Pa. (1,2).

LEAF SCORCH—cause unknown, often attributed to water deficiency and high temperature or to previous winter injury, but not confirmed; may be related to the following. Northeastern States (1,2).

MOTTLE LEAF—cause unknown, virus suspected but not yet shown transmissible. Conn., N.J., N.Y., Pa. (1,2).

Lithocarpus

L. densiflora (Hook. & Arn.) Rehd., tanbark-oak. Range 1,4.

Evergreen tree; important source of tanbark, also cultivated for ornament, zone 7.

Ceuthocarpum conflictum (Cke.) Berl., leaf spot. Calif.

Chlorociboria aeruginosa (Oed. ex Fr.) Seaver, sapwood stain. Calif.

Cronartium quercuum (Berk.) Miyabe (II,III), rust. Calif. O and I on 2- and 3-needled pines.

Odontia fimbriata Fr., on dead wood. Calif.

Pestalotia castagnei Desm., leaf blight. Calif.

Poria spp., wood rot of dead trunks and logs: *P. ferrea* (Pers.) Bourd. & Galz., *P. versipora* Pers. ex Rom., and *P. viridans* Berk. & Br.—Calif.

Stereum hirsutum Willd. ex Fr., wood rot. Calif.

Quercus, oak

I. White Oak Group, Eastern and Central United States

(1) *Quercus* alba L., white oak. Range 20,22, 23,24,25,26,27,28,29,30.

(2) *Quercus bicolor* Willd., swamp white oak. Range 21,22,23,24,25,26,27,28.
(3) *Q. lyrata* Walt., overcup oak. Range 20,22, 25,28,29,30.
(4) *Q. macrocarpa* Michx., bur oak. Range 15, 16,18,19,20,21,22,23,24,25,26,27,28,29,30.
(5) *Q. stellata* Waugh., post oak. Range 19,20, 22,25,27,28,29,30.

Large forest trees, except (5) small to medium-sized, important commercially for cabinet and construction wood, posts, and ties; (1,3, and 4) are also cultivated for shade and ornament; useful to wildlife.

Actinopelte dryina (Sacc.) Hoehn., leaf spot. Occasional, N.Y. to Ga., Tex., and Wis. (1,4,5).

Aleurodiscus spp., bark patch, on dead branches or on trunks of living trees, usually superficial but sometimes injuring suppressed trees: *A. oakesii* (Berk. & Curt.) Cke.—Pa. to N.C., Mo., and Wis. (1,4); N.C. (5); *A. acerinus* (Pers. ex Fr.) Hoehn. & Litsch.—Md., N.Y. (1); *A. candidus* (Schw.) Burt —Md., N.C., Tenn., Va. (1); N.C. (5); *A. griseocanus* (Bres.) Hoehn. & Litsch.—Iowa (1).

Anthostoma dryophilum (Curr.) Sacc., on dead branches. Iowa, N.J., Tex. (1). *A. gastrinum* (Fr.) Sacc.—Ga. (1).

Armillaria mellea Vahl ex Fr., shoestring root rot, white spongy butt rot. Northeastern and North Central States to Va. and Ill. (*).

Articularia quercina (Pk.) Hoehn., on fallen leaves, associated with *Microstroma album*. Miss. (3,4).

Botryosphaeria quercuum (Schw. ex Fr.) Sacc., on dead branches. Mass. to S.C. and Mo. (*). *B. ribis* (Tode ex Fr.) Gross. & Dug.—Md., Va. (1).

Ceratophorum uncinatum (Clint.) Sacc., on leaves. Ill., Ind., Mo. (3,5).

Chalara quercina Henry, wilt, dieback. Ill., Iowa, Minn., Wis. (1,4—somewhat resistant); Iowa, Mo. (5).

Chlorociboria aeruginosa (Oed. ex Fr.) Seaver, on dead wood, green stain. Cosmopolitan.

Cladosporium brevipes Pk., leaf mold. N.Y. (1). *C. herbarum* Pers. ex Lk.—Iowa (1).

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla., Mo. (1); Okla. (4,5).

Coccomyces coronatus (Schum. ex Fr.) de N., on fallen leaves. N.Y. to Ga. (1).

C. triangularis (Schw. ex Fr.) Sacc., on twigs. Mass. to Ga., Ohio, and Mich. (1). SEE ALSO *Colpoma quercinum*.

Colpoma quercinum (Pers. ex Fr.) Wallr., on twigs, ?dieback. Ga., Iowa, Pa. (1).

Coniothyrium ?truncisedum Vest., on twigs, ?dieback. Ill. (1,2,4).

Conopholis americana (L.f.) Wallr., "squaw-root." Md., Va. (2).

Corticium maculare Lair, smooth patch. N.C. (1,5). Numerous *Corticium* species are reported on dead wood and fallen branches; of these, *C. caeruleum* Schrad. ex Fr., *C. galactinum* (Fr.) Burt, *C. lividum* Pers. ex Fr., and perhaps others, cause sapwood rot of dead trunks and logs, sometimes heart rot after fire damage.

Coryneum kunzei Cda.: SEE *Pseudovalsa longipes*.

Cronartium cerebrum Hedgc. & Long (II,III), leaf rust. N.J. to Tenn., Mo., and Wis. (1); Ga., Md., Miss., Wis. (2); Iowa, Kans., Okla., S. Dak., Wis. (4). *C. fusiforme* Hedgc. & Hunt (II,III)— Md. (1,2); Ala., Fla., Ga., Miss. (5). *C. strobilinum* Hedgc. & Hahn (II)—Ark., Ill., Miss. (1); Iowa, Kans., Mo. (4); Ark., Miss., S.C. (5). These species are all referred by some authorities to *C. quercuum* (Berk.) Miyabe with O and I on 2- and 3-needle *Pinus* spp.

Cryptospora leiphaemoides Dearn. & House, on dead twigs. N.Y. (1).

C. leiphaemoides Fckl. has priority. SEE ALSO *Diaporthe leiphaemia* var. *raveneliana*.

Cryptosporella albofusca (Cke. & Ell.) Sacc., on branches. N.J. (1).

Cuscuta spp., dodder. Occasional in forest nurseries (*). *C. exaltata* Engelm.—Tex. (1).

Cylindrosporium microspilum Sacc. & Wint., leaf spot. Ill., Mo. (1,4).

Cytospora spp., on dead twigs. Conidial stage of *Valsa* spp.

Cytosporella paucispora Pk., on twigs. Pa. (1).

Daedalea quercina L. ex Fr., brown cubical rot of dead trunks and logs, heart rot of living trees. Mass. to Va., Mo., and Minn. (1); Md. (2).

D. ambigua Berk., sapwood rot usually of stumps and logs. Ark., Miss., Mo., Tex. (1).

D. confragosa Bolt. ex Fr.—N.Y. to Ala. and Ark. (1), Nebr. (4).

D. unicolor Bull. ex Fr.—Ala., N.C., Va., Wis. (1).

Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., sapwood rot of stumps and logs. Northeastern and North Central States to Ga. and La. (*).

D. vernicosa (Schw.) Ces. & de N.—Md. to N.C. and Mo. (*).

Dermatea lobata Ell., on dead twigs. Confused name (fide Groves), perhaps=*Velutaria*.

Diaporthe leiphaemia (Fr.) Sacc. var. *raveneliana* (Thuem. & Rehm) Wehm., on dead branches. Mass. to Fla., Mo., and Mich. (1); Ill. (2).

Diatrype spp., as *D. stigma* Hoffm. ex Fr., *D. virescens* (Schw.) Cke., and others, on dead branches. Cosmopolitan.

Dichaena quercina Pers. ex Fr., on bark of living or dead branches. Ala., La., N.J., S.C., Tex. (1).

Diplodia longispora Cke. & Ell., twig blight. N.Y. to N.C., Ill., and Wis. (1,4). Sometimes referred to *Physalospora glandicola* but not confirmed. Other *Diplodia* spp. reported on twigs are probably conidial stages of *Physalospora* spp.

Discohainesia oenotherae (Cke. & Ell.) Nannf., on fallen leaves. Va. (1).

Dothiorella phomiformis (Sacc.) Petr. & Syd., leaf spot. Mass. to N.J., Mo., and Wis. (1); Wis. (2); Conn., Iowa (4); Fla. (5).

D. quercina (Cke. & Ell.) Sacc.: SEE *Physalospora glandicola*.

Endothia gyrosa (Schw.) Fr., on dead branches and exposed roots. Md. to Ala., La., and Ind. (*).

E. parasitica (Murr.) P. J. & H. W. Anderson, twig canker. Conn., Ga., Md., Pa., Tenn., Va. (chiefly 5, occasionally 1).

E. radicalis (Schw. ex Fr.) Ces. & de N., on dead branches. Md. to S.C. and Miss. (1).

Eutypa spp., on dead twigs and branches, the following commonly reported: *E. quercina* Sacc.—Va. (1); *E. spinosa* (Pers. ex Fr.) Tul.—N.J. to Ala., Mo., and Wis. (*).

Favolus alveolaris (DC. ex Fr.) Quél., on dead wood, usually fallen branches. Cosmopolitan.

Fenestella phaeospora Sacc., on dead twigs. Ga. (1).

Fistulina hepatica Huds. ex Fr., on stumps and base of dead trunks, brown heart. Conn. to Va. and Tenn. (1). *F. pallida* Berk. & Rav.—Ala. (1).

Fomes spp., various wood rots, sometimes on living trees; more or less general with host range but specific reports as follows:

F. applanatus (Pers. ex Wallr.) Gill., white-mottled butt and heart rot. Northeastern and North Central States to Va. and Mo. (*).

F. connatus (Weinm. ex Fr.) Gill., white heart rot. Ohio, Va. (1).

F. everhartii (Ell. & Gall.) Schrenk, white spongy heart rot. Eastern States to N.C., Mo., and Iowa (*).
F. fomentarius (L. ex Fr.) Kickx—white sapwood and heart rot. Ala. (1).
F. fraxinophilus (Pk.) Sacc.—N. Dak., S. Dak. (4).
F. igniarius L. ex Fr., white spongy heart rot. General (*).
F. lobatus (Schw.) Cke.—Ark., La., Miss., N.C. (*).
F. marmoratus Berk. & Curt.—Ala. (1).
F. ohiensis (Berk.) Murr., on dead wood. N. Dak. (4).
Ganoderma curtisii (Berk.) Murr., white butt and heart rot. Ark., Ga., Miss., N.C., Tex. (1). *G. sessile* Murr.—Iowa (4).
Gloeodes pomgiena (Schw.) Colby, on dead twigs. Ind. (1).
Gloeosporium spp., leaf spot, anthracnose:
G. bicolor J. J. Davis—Wis. (2). *G. bicolor* McAlp. has priority.
G. canadense Ell. & Ev. (=*G. quercinum* West.?)—Conn., Ky., Iowa, Mich., N.Y., Wis. (1,2,4).
G. divergens Pk.—N.Y. (1). (=*G. quercinum* West.?)
G. martini Sacc. & Ell.: See *Marssonina martini.*
G. nervisequum (Fckl.) Sacc., as reported on *Quercus* is *G. quercinum.*
G. quercinum West.: See *Gnomonia quercina.*
G. septorioides Sacc., as reported on white oaks is *Marssonina martini.*
G. umbrinellum Berk. & Br.: See *Gnomonia quercina.*
Gnomonia quercina Kleb., anthracnose, leaf and twig blight. Mass. to Ga., Kans., and Minn. (1); N.Y. (2); Ky. to Kans. and Wis. (4); Ga., ?Oreg. (5). Has usually been identified as *G. veneta* (Sacc. & Speg.) Kleb., an untenable name even when applied to the anthracnose fungus on *Platanus.* As the oak fungus differs in some respects it seems best to designate it by a distinctive name.
G. setacea (Pers. ex Fr.) Ces. & de N., on fallen leaves. Ga., Md. (1); Ga. (4,5). In a collective sense perhaps includes the previous name.
Godronia tabacina (Cke.) Seaver, on dead branches. N.J. (1).
Godroniopsis quernea (Schw.) Diehl & Cash, on dead twigs. N.J. (1).
Graphium rubrum Rumbold, sapwood stain. Ohio (1); Ark., Miss., S.C. (3).
Hericium erinaceus (Bull. ex Fr.) Pers., white spongy butt and heart rot. N.Y. to Ala., Ark., and Iowa (1).
Hymenochaete spp., on dead wood, usually fallen branches and logs, sometimes in heartwood of living trees: *H. curtisii* (Berk.) Morg.—Iowa, N.Dak. (4); Md., Pa., Va. (5); *H. rubiginosa* (Schrad. ex Fr.) Lév.—Ind., Md., Minn., Va. (1); Ohio (2); N.Y. (4); Tex. (5); *H. tabacina* (Sow. ex Fr.) Lév.—Md. (1).
Hypholoma sublateritium Fr., on dead wood, usually logs and stumps. Cosmopolitan (*).
Hypoxylon spp., on dead wood, usually logs and branches. See also *Nummularia.* The following (and others) are commonly reported: *H. annulatum* (Schw.) Mont.—N.J. to Ala., La., and Mo. (1,5); *H. atropunctum* (Schw. ex Fr.) Cke.—Md. to Ga. and Mich. (1,5); *H. howieanum* Pk. (=*H. fragiforme* (Pers. ex Fr.) Kickx?)—Ga., N.Y. (1); *H. marginatum* (Schw.) Berk.—general; *H. morsei* Berk. & Curt.—N.H., Wis.; *H. multiforme* Fr.—Ind., Iowa, Kans. (1); *H. punctulatum* (Berk. & Rav.) Cke.—Ala., Ga., Miss., Tenn., Va. (1); *H. truncatum* (Schw. ex Fr.) J. H. Miller—Ga., Mich., N.C., Tenn. (1).
Irpex cinnamomeus Fr. (=*I. fuscescens* Schw.?), wood rot of logs and dead branches. Cosmopolitan (*). *I. mollis* Berk. & Curt.—Mich., N.J. (1). *I. pachydon* (Pers.) Quél.—Iowa, Tex. (1). *I. ravenelii* Berk.—Ark., La., Miss. (1).
Lentinus tigrinus Bull. ex Fr., and *L. velutinus* Fr., on dead wood, sometimes wound rot of living trees. La., Miss. (1).
Lenzites betulina L. ex Fr., brown cubical rot, usually of logs and stumps. General (*).
Marssonina martini (Sacc. & Ell.) Magn., brown bordered leaf spot, eyespot. General with host from N.Y. to Miss., Tex., and N. Dak. (*). *M. quercus* (Pk.) Magn. is probably a synonym.
Merulius tremellosus Schrad. ex Fr., and *M. rubellus* Pk., wood rot usually of logs and branches, sometimes heart rot of living trees. Cosmopolitan (*).
Microsphaera alni DC. ex Wint. (*M. quercina* (Schw.) Burr.), powdery mildew. General (*). Var. *calocladophora* (Atk.) Salm.—Tenn. (1); var. *extensa* (Cke. & Pk.) Salm.—Ga., Ill., Iowa, Mass., N.C., N.Y. (1).
Microstroma album (Desm.) Sacc., on fallen leaves, "frosty mildew." Fla., Ill., W. Va. (1); Ill. (3).
Monochaetia desmazieri (*desmazierii*) Sacc., leaf spot. Maine to S.C. and Tenn. (1); N.J. to N.C. and Ark. (5). *M. taphrinicola* (Ell. & Ev.) Sacc.—N.J. (1).
Morenoelia quercina (Ell. & Martin) Th., black mildew. Ga., Tex. (5).
Mycosphaerella maculiformis (Pers. ex Fr.) Schroet., on fallen leaves. N.Y. (1), Ga. (3), Va. (5). *M. nigrita* (Cke.) J. H. Miller—N.Y. (1), Ga. (3). *M. punctiformis* (Pers. ex Fr.) Schroet.—N.Y. to Ga. and Wis. (1). *M. spleniata* (Cke. & Pk.) House—Ga. (1,5), N.Y. (1,2); Kans., Nebr., Wis. (4).
Nectria cinnabarina Tode ex Fr., on twigs and branches. Mass. to Ala. and Mich. (*).
N. galligena Bres., trunk canker. N.H. to Va. and W. Va. (1,2).
Nigrospora sphaerica (Sacc.) Mason, on twigs, ?dieback. Ill. (5).
Nummularia clypeus (Schw.) Cke., on dead branches. Eastern and Central States to Ga. and N. Dak. (*). Designated as *Hypoxylon mediterraneum* (de N.) J. H. Miller by some authorities. American material referred to *N. bulliardii* Tul. belongs here.
Panus stipticus Fr., on dead wood, sapwood rot. Cosmopolitan.
Peniophora aspera (Pers.) Sacc. (*P. setigera* (Fr.) Hoehn. & Litsch., *Odontia setigera* (Fr.) L. W. Miller), on dead wood and bark. Cosmopolitan.
Phaeobulgaria inquinans (Pers. ex Fr.) Nannf., on dead wood and bark. Cosmopolitan.
Pholiota adiposa Batsch ex Fr., on dead wood, sometimes heart rot of living trees. Cosmopolitan.
Phoma glandicola (Schw.) Cke.: See *Physalospora glandicola.*
Phoma glandicola (Desm.) Lév., also as *Phomopsis glandicola* (Lév.) Grove, reported on acorns in Ind., Md., N.Y., Ohio (1), has priority. *P. quercina* (Pk.) Sacc., on twigs, ?canker. Conn., Mass., Md., N.J., N.Y., Wis. (1,4); Ill. (5).
Phomopsis sp., trunk and branch gall. Md., Va., Tex., Wis. (1,4,5).
Phoradendron flavescens (Pursh) Nutt., mistletoe. Ind., N.C., Tex. (1,3,4,5).
Phyllactinia corylea Pers. ex Karst., powdery mildew. N.C., N.J. (1); Ill., Miss., Va. (4); Ala., Fla., Ga., Miss., Mo., N.J. (5).
Phyllosticta spp., on fading leaves or associated with distinct spots: *P. livida* Ell. & Ev.—Wis. (4); *P. quercea* J. J. Davis—Wis. (2); *P. quercus* Sacc. & Speg.—Wis. (4); *P. tumoricola* Pk.—N.Y. (1). *P. phomiformis* Sacc.: See *Dothiorella phomiformis.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).

Physalospora glandicola (Schw.) N. E. Stevens, canker, dieback; also on galls and acorns. Conn. to Ala., Ill., and Minn. (1); Ill. (4,5). *P. abdita* (Berk. & Curt.) N. E. Stevens, *P. obtusa* (Schw.) Cke., and *P. rhodina* (Berk. & Curt.) Cke. are similarly reported in this range, often in the conidial stage only, as *Sphaeropsis* spp.

P. quercifolia Ell. & Ev., on leaves. Nebr. (4).

Phytophthora cinnamomi Rands, root rot of seedlings. Md. (1).

Polyporus spp., various wood rots:

P. berkeleyi Fr., white stringy butt and heart rot. Pa. to Ala. and Mo. (*).

P. compactus Overh. N.J., Pa. (1).

P. croceus Pers. ex Fr., white pocket heart rot. N.Y. to N.C., Ark., and Minn. (1).

P. dryadeus Pers. ex Fr., white root and butt rot. N.Y. to Va., Ark., and Minn. (1).

P. frondosus Dicks. ex Fr., yellowish spongy heart rot. Mass. to Va. and Ark. (*).

P. hispidus Bull. ex Fr., canker, heart rot. Ark., Conn., Miss., Va. (1).

P. obtusus Berk.—Md. to Ala. and Wis. (1,5).

P. rheades (Pers.) Fr., white pocket heart rot. Northeastern and Central States to Miss. and Tex. (*).

P. spraguei Berk. & Curt., brown crumbly heart rot. N.Y. to Va., La., and Wis. (1).

P. sulphureus Bull. ex Fr., brown cubical heart rot. Northeastern and Central States to Ga. and Ark. (*).

Polyporus spp., usually on dead trunks, logs, and branches; sometimes sapwood or heart rot of living trees; distribution general unless otherwise noted: *P. adustus* Willd. ex Fr.; *P. biformis* Klotzsch; *P. caesius* Schrad. ex Fr.—Pa. to N.C.; *P. cinnabarinus* Jacq. ex Fr.; *P. dichrous* Fr.—Ark., Ind., N.J., Tenn., Va., Wis. (1); *P. gilvus* (Schw.) Fr.; *P. hirsutus* Wulf. ex Fr.; *P. pargamenus* Fr.; *P. resinosus* Schrad. ex Fr.—Va. (1); *P. rigidus* Mont.—Ark., La., Miss.; *P. robiniophilus* (Murr.) Lloyd—Iowa (1); *P. tulipiferus* (Schw.) Overh. (1); *P. versicolor* L. ex Fr.; *P. zonalis* Berk.—Ark., La. (1,3).

Poria spp., various wood rots, usually on fallen trunks and branches or timber; the following commonly reported: *P. ambigua* Bres.—Ark. (1); *P. andersonii* (Ell. & Ev.) Neuman—Pa. to N.C., Ark., and Wis. (*); *P. cocos* Wolf—La., Miss., N.C., Va. (1); *P. contigua* (Fr.) Cke.—Conn., Ind., Pa., Va. (1); *P. ferruginosa* (Schrad. ex Fr.) Karst.—general (*); *P. nigra* Berk.—Ind., Mo., Va. (1); *P. pulchella* (Schw.) Cke.—Md., N.Y. (1); *P. punctata* (Fr.) Cke.—N.Y. to Va., Mo., and Wis. (*); *P. semitincta* (Pk.) Cke.—Ind., Md., Pa., Va. (1); *P. spissa* (Schw.) Cke.—Ind., Mich., Va. (1); *P. undata* (Pers.) Bres.—Ark., La., Md. (1); *P. unita* (Pers.) Cke.—Md., S.C., Va. (*); *P. versipora* Pers. ex Rom.—general.

Pseudovalsa longipes (Tul.) Sacc. (*P. sigmoidea* (Cke. & Ell.) Sacc.), canker, dieback. Ill., Iowa, Mich., N.J., Pa., Va., Wis. (1).

Pyrenochaeta minuta Carter, twig canker. Ill. (1).

Rosellinia corticium (Schw.) Sacc. (*R. aquila* of most American authors), on dead branches. Ark., Ga., Ind., W. Va. (*).

Schizophyllum commune Fr., sapwood rot of dead trunks and branches. Cosmopolitan.

Scleroderma vulgare Hornem., parasitic mycorhiza. Mich. (1).

Septogloeum querceum J. J. Davis, leaf spot. Wis. (2).

Septoria dryina Cke., leaf spot. Oreg. (5).

S. quercus Thuem.—Ill. (1).

Sphaerognomonia polystigma (Ell. & Ev.) Thompson & J. H. Miller, on fallen leaves. Ga. (1).

Sphaeropsis gallae (Schw.) Berk. & Curt. and *S. quercina* Cke. & Ell.: See *Physalospora glandicola*.

Sphaeropsis linearis Pk., on twigs, ?dieback. N.Y. (1).

Sphaerotheca lanestris Harkn., brown mildew. Ala., Ill., Iowa, Miss. (1); (2,4); Miss. (5).

Sphaerulina myriadea (DC. ex Fr.) Sacc., on fallen leaves. Md. (1).

Steccherinum ochraceum (Pers. ex Fr.) S. F. Gray, wood rot, usually of dead trunks and logs. General (*). *S. adustum* (Schw.) Banker—Mo., N.C., Va. (1). *S. laeticolor* (Berk. & Curt.) Banker—Ala., La., Tex. (1,3). *S. pulcherrimum* (Berk. & Curt.) Banker—Ark., Iowa, La., Md. (1,3,4).

Stereum spp., various wood rots:

S. frustulosum Pers. ex Fr., white pocket butt rot. General (*).

S. gausapatum Fr., white pocket butt and heart rot. Conn. to N.C., Ark., and Wis. (*).

S. subpileatum Berk. & Curt., white pocket heart rot. N.Y. to Va., La., and Mo. (*).

Stereum spp., on dead wood, usually logs, stumps, and branches: *S. albobadium* (Schw.) Fr.—Va. (1); *S. fasciatum* Schw.—general; *S. fuscum* Schrad. ex Quél.—general; *S. hirsutum* Willd. ex Fr.—general (*); *S. rameale* Schw.—general (*); *S. sericeum* Schw.—Ind., N.C., Pa. (1); *S. umbrinum* Berk. & Curt.—general (*); *S. versiforme* Berk. & Curt.—Md., Pa., Va. (1).

Strumella coryneoidea Sacc. & Wint., trunk and branch canker. N.H. to Va., Mo., and Mich. (*). Said to be the conidial stage of *Urnula craterium* (Schw.) Fr.

Taphrina caerulescens (Mont. & Desm.) Tul., leaf blister. General (1,4,5).

Thelephora albido-brunnea Schw., and *T. terrestris* Ehr. ex Fr., on base of young trees, ?canker. Ind., N.C. (1).

Trametes spp., brown cubical rot of logs, dead branches, and timber: *T. hydnoides* Sw. ex Fr.—Tex. (1); *T. mollis* (Sommerf.) Fr.—Northeastern and North Central States (*); *T. morgani* Lloyd (=*T. serialis* Fr.?)—Pa. (1); Nebr. (4); *T. pusila* Lloyd—N.Y. (1); *T. sepium* Berk.—Ga., Ill., La., N.J.; *T. tenuis* Karst.—S. Dak., Wis. (1,4).

Ustulina deusta (Hoffm. ex Fr.) Petr., usually on dead wood, sometimes trunk canker. Ga., Ill., Maine, Md., Pa., Va. (*).

Valsa intermedia Nits., on twigs and branches, ?canker. Ill. (1).

Venturia orbicula (Schw.) Cke. & Pk., on fallen leaves. N.J., N.Y. (1); Kans. (4).

Xylaria spp., on dead wood: *X. hypoxylon* (L. ex Fr.) Grev., *X. multiplex* (G. Kunze & Fr.) Berk. & Curt., and *X. polymorpha* (Pers. ex Fr.) Grev. are commonly reported (*).

Erineum—leaf deformity caused by mites (*Eriophyes* sp.). Va. (1).

II. White Oak Group, Western United States

(1) *Quercus gambelii* Nutt. (including *Q. leptophylla* Rydb. and *Q. utahensis* (DC.) Rydb.), Rocky Mountain white oak. Range 9,10,11,13,14.

(2) *Q. garryana* Hook., Oregon white oak. Range 1,2.

(3) *Q. lobata* Née, valley white oak. Range 3,4,5.

Large trees furnishing commercially useful wood and also planted for shade or ornament (2,3), or small trees or shrubs (1); acorns and sprouts furnish food for livestock and wildlife.

Armillaria mellea Vahl ex Fr., root rot. Oreg. (2); Calif. (3).
Coccomyces coronatus (Schum. ex Fr.) de N., on fallen leaves. Oreg. (2).
Coryneum megaspermum Syd., on dead branches. Colo. (1).
Cronartium cerebrum Hedgc. & Long (*C. quercuum* (Berk.) Miyabe?) (II,III), leaf rust. Calif. (2). O and I on *Pinus* spp.
Cylindrosporium kelloggii Ell. & Ev., leaf spot. Calif. (2).
Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., on dead wood. Calif., Oreg. (2).
D. vernicosa (Schw.) Ces. & de N.—Oreg. (2).
Diatrype stigma Hoffm. ex Fr., on dead branches. Colo., Utah (1); Oreg. (2). *D. albopruinosa* (Schw.) Cke.—Utah (1).
Diatrypella aspera (Fr.) Nits., on dead branches. Colo. (1).
Endothia singularis (Syd.) Shear & N. E. Stevens, on dead branches. Ariz., Colo., N. Mex. (1).
Fomes spp., various wood rots:
F. annosus (Fr.) Cke., heart rot. Colo. (1).
F. applanatus (Pers. ex Wallr.) Gill., butt rot. Oreg. (2).
F. everhartii (Ell. & Gall.) Schrenk, heart rot. Calif., N. Mex. (1).
F. igniarius (L. ex Fr.) Kickx—white spongy heart rot. Ariz., N. Mex. (1); Oreg. (2).
Ganoderma polychromum (Copeland) Murr., wood rot. Calif. (3).
Gloeosporium quercinum West., leaf spot, anthracnose. Oreg. (2). Conidial stage of *Gnomonia quercina* Kleb.
Hymenochaete spp., on dead wood: *H. curtisii* (Berk.) Morg.—Oreg. (2); *H. rubiginosa* (Schrad. ex Fr.) Lév.—Wash. (2); *H. tabacina* (Sow. ex Fr.) Lév. —Oreg. (2).
Hypholoma fasciculare Huds. ex Fr., on dead wood. Oreg. (2).
Hypoxylon spp., on dead wood: *H. annulatum* (Schw.) Mont.—Oreg. (2); *H. atropunctatum* (Schw.) Ell. & Ev.—Oreg. (2); *H. fragiforme* (Pers. ex Fr.) Kickx—Oreg. (2).
Lenzites betulina L. ex Fr., brown sapwood rot. Calif. (2).
Microsphaera alni DC. ex Wint., powdery mildew. Utah (1); Calif., Oreg., Wash. (2); Calif. (3). Var. *calocladophora* (Atk.) Salm.—Wash. (2).
Mycosphaerella sp., leaf spot. Oreg. (2). *M. maculiformis* (Pers. ex Fr.) Schroet., on fallen leaves. N. Mex. (1). *M. spleniata* (Cke. & Pk.) House—Colo., Utah (1).
Nectria galligena Bres., trunk and branch canker. Oreg. (2).
N. punicea Schum. ex Fr., on bark. Oreg. (1).
Nummularia clypeus (Schw.) Cke., on dead branches. Utah (1); Oreg., Wash. (2).
Phoradendron villosum Nutt., mistletoe. Calif., Oreg. (2,3).
Polyporus spp., various wood rots, usually on living trees:
P. obtusus Berk., heart rot. N. Mex. (1).
P. rheades (Pers.) Fr., white spongy root and butt rot. Ariz., Colo., N. Mex., Utah (1); Oreg., Wash. (2); Calif. (2,3).
P. spraguei Berk. & Curt., brown heart rot. Oreg., Wash. (2).
P. sulphureus Bull. ex Fr., brown cubical heart rot. General (*).
Polyporus spp., on dead wood: *P. adustus* Willd. ex Fr.—Oreg. (2); *P. biformis* Klotzsch—Wash. (2); *P. cinnabarinus* Jacq. ex Fr.—N. Mex. (1); *P. dichrous* Fr.—Wash. (2); *P. fissus* Berk.—Oreg. (2); *P. gilvus* (Schw.) Fr.—Oreg. (2); *P. glomeratus* Pk.—Oreg. (2); *P. hirsutus* Willd. ex Fr.—Wash. (2); *P. pargamenus* Fr.—Oreg., Wash. (2); *P. versicolor* L. ex Fr.—Oreg., Wash. (2).
Poria andersonii (Ell. & Ev.) Neuman, white spongy heart rot. Ariz. (1), Oreg. (2), Calif. (3). Other species recorded on dead wood: *P. ferruginosa* (Schrad. ex Fr.) Karst.—N. Mex. (1), Oreg. (2); *P. pulchella* (Schw.) Cke.—N. Mex. (1), Calif. (3); *P. ferrea* (Pers.) Bourd. & Galz.—Oreg., Wash. (2); Calif. (3); *P. versipora* Pers. ex Rom. —Oreg. (2).
Schizophyllum commune Fr., sapwood rot. Calif. (2).
Septoria ocellata (Lév.) Sacc., leaf spot. Oreg. (2).
Sphaerotheca lanestris Harkn., brown mildew. Calif. (3).
Stereum gausapatum Fr., on dead wood, ?heart rot. Oreg. (2).
S. hirsutum Willd. ex Fr.—Oreg., Wash. (2).
S. rameale Schw.—Oreg., Wash. (2).
Strumella coryneoidea Sacc. & Wint., trunk canker. Oreg. (2).
Taphrina caerulescens (Mont. & Desm.) Tul., leaf blister. Colo., Utah, Wyo. (1); Calif. (3).
Trametes tenuis Karst., wood rot. Oreg. (2).

III. Chestnut Oak Group, Eastern United States

(1) *Quercus montana* Willd., chestnut oak. Range 22,24,25,26,27,28,29. (Usually upland.)
(2) *Q. prinus* L., swamp chestnut oak, basket oak. Range 20,25,28,29,30; usually near the coast.
(3) *Q. muhlenbergii* Engelm., chinquapin oak. Range 11,16,20 to 30.
(4) *Q. prinoides* Willd., dwarf chinquapin oak. Range 21 to 30.

Large forest trees (1,2), or smaller (3), and sometimes shrubby (4); useful to wildlife. *Q. prinus* L. is interpreted by some authorities as applicable to the upland form, *Q. montana* being reduced to synonymy. The lowland form, also known as *Q. michauxii* Nutt., is then reduced to varietal rank.

Actinopelte dryina (Sacc.) Hoehn., leaf spot. N.J., Va., W. Va. (1,2).
Anthostoma gastrinum (Fr.) Sacc., on bark. Ga. (1).
Armillaria mellea Vahl ex Fr., root rot. N.J. to N.C. and W. Va. (1,2).
Articularia quercina (Pk.) Hoehn., on dead leaves. Miss. (2).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Okla. (4).
Coccomyces coronatus (Schum. ex Fr.) de N., on fallen leaves. Tenn. (2).
Coryneum kunzei Cda.: SEE *Pseudovalsa longipes.*
Coryneum pustulatum Pk., on twigs. Md. (3).
Cronartium cerebrum Hedgc. & Long (II,III), leaf rust. Ga., Md., W. Va. (1,2); Kans. (4).
Cytospora sp., on twigs, ?dieback. N.J. (1).
Daedalea quercina L. ex Fr., brown heart rot. Pa. (1).
Diatrype albopruinosa (Schw.) Cke. & Ell., on dead branches. Kans. (1).
D. stigma Hoffm. ex Fr.—Ga. (1).
Dichaena strumosa Fr., on twigs, ?canker. W. Va. (1).
Diplodia longispora Cke. & Ell., canker, twig blight. Conn. and N.Y. to N.C. (1,2). Some reports of *Sphaeropsis quercina* belong here.
D. suberina Dur. & Mont.—N.J., Pa. (1).
Dothiorella phomiformis (Sacc.) Petr. & Syd., leaf spot. Mass. to N.C. and Kans. (1,2); Ill. (3).
Endoconidiophora variospora Davidson, on bark, ?wood stain. W. Va. (1).

Endothia parasitica (Murr.) P. J. & H. W. Anderson, on twigs, ?canker. Md., W. Va. (1,2).
E. gyrosa (Schw.) Fr., on dead twigs. Ind. (1).
E. radicalis (Schw. ex Fr.) Ces. & de N.—Md., N.C., Va. (1,2).
Fenestrella phaeospora Sacc., on dead branches. Ga. (1,2).
Fistulina hepatica Huds. ex Fr., sprout butt rot. Va. (1).
Fomes annosus (Fr.) Cke., white spongy root and butt rot. Pa. (1).
F. everhartii (Ell. & Gall.) Schrenk, heart rot. N.C., Ohio, Va. (1).
F. igniarius (L. ex Fr.) Kickx—Va. (1).
Gnomonia quercina Kleb. (*Gloeosporium quercinum* West.), anthracnose, leaf spot. Conn., N.J., W. Va. (1,2).
G. setacea (Pers. ex Fr.) Ces. & de N., on fallen leaves. Ga. (1,2), W. Va. (1).
Harknessia hyalina Ell. & Ev. (=*Gloeosporium quercinum?*), leaf spot. N.J. (1).
Hericium erinaceus (Bull. ex Fr.) Pers., sprout butt rot. Va. (1).
Hypoxylon spp., on dead wood, sapwood rot; the following commonly reported, N.J. to Ga. and Ind. (1,2): *H. annulatum* (Schw.) Mont.; *H. howieanum* Pk.; *H. marginatum* (Schw.) Berk.; *H. serpens* Pers. ex Fr.; *H. truncatum* (Schw. ex Fr.) J. H. Miller.
Leptothyrium castaneae (Spreng.) Sacc. var. *quercus* Massal., on dead leaves. Va. (1).
Marssonina martini (Sacc. & Ell.) Magn., leaf spot. Pa. to Miss. and Mo. (1,2); Ind., Kans., Miss., Okla., Wis. (3).
Microsphaera alni DC. ex Wint., powdery mildew. N.J. to Miss., Kans., and Iowa (*). Also var *extensa* (Cke. & Pk.) Salm.—Iowa (4).
Monochaetia desmazieri Sacc., leaf spot. Ga., N.C., Tenn. (1).
Morenoella quercina (Ell. & Mart.) Th., black mildew. Ga. (2).
Mycosphaerella maculiformis (Pers. ex Fr.) Schroet., on fallen leaves. Ga., N.Y., Pa. (1,3). *M. punctiformis* (Pers. ex Fr.) Schroet.—Ga., N.Y. (1). *M. spleniata* (Cke. & Pk.) House—Ga. (1,2), N.Y. (1,4).
Myxosporium castaneum Pk. var. *quercus* Pk., on dead branches. N.Y. (1).
Nectria galligena Bres., trunk canker. Conn. (1).
Nummularia clypeus (Schw.) Fr., on dead branches. Ga. (1).
Ovularia sp., leaf spot. Kans. (1).
Phomopsis quercinum (Sacc.) Hoehn., on acorns. Va. (2). Twig canker—Okla. (3).
Phyllosticta quercus-prini Ell. & Ev., leaf spot. W. Va. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Physalospora glandicola (Schw.) N. E. Stevens, dieback, twig canker. Md., N.J., Va. (1,2); Ill. (3).
Phytophthora cinnamomi Rands, root rot of seedlings. Md. (1).
Polyporus spp., various wood rots, sometimes on living trees:
P. dryadeus Pers. ex Fr., white root and butt rot. Ark., Md., Okla., Tex., Va. (2).
P. frondosus Fr.—Va. (1).
P. hispidus Bull. ex Fr., canker, heart rot. Conn., Va. (1).
P. rheades (Pers.) Fr., trunk rot. Pa. to N.C., La., and Okla. (1,2).
P. spraguei Berk., heart rot. Ind. (1,2).
P. sulphureus Bull. ex Fr., sprout butt rot. Va. (1).
Polyporus spp., on dead wood: *P. cinnabarinus* Jacq. ex Fr., *P. gilvus* (Schw.) Fr., *P. hirsutus* Wulf. ex Fr., *P. pocula* (Schw.) Berk. & Curt., *P. rigidus* Mont.
Poria inflata Overh.—brown heart rot. Va. (1).
P. pulchella (Schw.) Cke. and *P. unita* (Pers.) Cke., on dead wood. Ind. (1).
Pseudovalsa longipes (Tul.) Sacc., on dead branches, canker, and dieback. Pa., W. Va. (1).
Septobasidium sinuosum Couch, on scale-infested branches. Fla. (2).
Septoria sp., leaf spot. Pa. (1).
Sphaerognomonia polystigma (Ell. & Ev.) Thompson & J. H. Miller, on fallen leaves. Ga. (1).
Sphaeropsis sp. (? *S. quercina* Cke. & Ell.), twig canker. Conn., N.J., N.Y., Pa. (1).
Sphaerotheca lanestris Harkn., brown mildew. Miss. (2).
Steccherinum ochraceum (Pers. ex Fr.) S. F. Gray, wood rot. Ind. (2); Ala., Ark. (3).
Stereum frustulosum Pers. ex Fr., and *S. gausapatum* Fr., butt rot, white pocket heart rot. Va. (1,3).
S. subpileatum Berk. & Curt.—Va. (1).
Strumella coryneoidea Sacc. & Wint., trunk canker. Conn. (1).
Taphrina caerulescens (Mont. & Desm.) Tul., leaf blister. Ga. (1).
Trametes morgani Lloyd (=*T. serialis* Fr.?), brown cubical rot of logs. Ind. (1).
Venturia orbicula (Schw.) Cke. & Pk., on fading leaves, leaf spot. N.Y. to Va. and Ohio (*).

IV. Miscellaneous White and Chestnut Oaks, Western United States

(1) *Quercus arizonica* Sarg., Arizona white oak. Range 10,11.
(2) *Q. douglasii* Hook. & Arn., California blue oak. Range 1,3,4,5,10.
(3) *Q. dumosa* Nutt., California scrub oak. Range 1,3,4,5,10.
(4) *Q. engelmanii* Greene, evergreen white oak. Range 5.
(5) *Q. oblongifolia* Torr., Mexican blue oak. Range 10,11,17.
(6) *Q. undulata* Torr., Rocky Mountain shin oak. Range 9,11,13,14,16,17,20.

Shrubs or small trees, somewhat to fully evergreen, useful in erosion control and for fuel, some furnish browse for livestock and are important food plants of wildlife.

Armillaria mellea Vahl ex Fr., root rot. Calif. (3,4).
Coryneum umbonatum Nees, on twigs. Calif. (2).
Cronartium conigenum Hedgc. & Hunt (II,III), leaf rust. Ariz. (1). O and I on cones of *Pinus chihuahuana*.
C. cerebrum Hedgc. & Long (II,III)—Calif. (3).
Diatrype albopruinosa (Schw.) Cke. & Ell., on dead branches. N. Mex. (6).
Diatrypella quercina (Pers. ex Fr.) Nits., on dead branches. N. Mex. (6).
Endothia singularis (Syd.) Shear & N. E. Stevens on dead branches. Colo. (6).
Fomes everhartii (Ell. & Gall.) Schrenk, white spongy heart rot. Ariz. (1), Calif. (5), Colo. (6).
F. praerimosus (Murr.) Sacc. & D. Sacc.—N. Mex. (6).
Nummularia clypeus (Schw.) Cke., on dead branches. Calif. (3).
Phoradendron villosum Nutt., mistletoe. Calif., Oreg. (2).
Phyllosticta livida Ell. & Ev., leaf spot. Calif. (2).
Polyporus rheades (Pers.) Fr., white pocket heart rot. Ariz. (1,5), Calif. (2,5), N. Mex. (5,6), Colo. (6). Other species on dead wood: *P. gilvus* (Schw.) Fr.—Ariz. (1), N. Mex. (5); *P. obtusus* Berk.—Ariz. (1); *P. tulipiferus* (Schw.) Overh.—Ariz. (1).

Sphaerotheca lanestris Harkn., brown mildew. Calif. (4).
Sporodesmium foliicola Desm. (=*Actinopelte dryina* (Sacc.) Hoehn.?), on leaves. Calif. (2).
Stereum hirsutum Willd. ex Fr., wood rot. Calif. (3).
Taphrina caerulescens (Mont. & Desm.) Tul., leaf blister. Calif. (2); Colo. (6).
Trabutia erythrospora (Berk. & Curt.) Th. & Syd., black spot, sooty blotch. Ariz. (1,5).

V. Red, Black, and Pin Oak Group

(1) *Quercus borealis* Michx. f., including the more robust form sometimes designated var. *maxima* (Marsh.) Ashe, northern red oak. Range 21,22,23,24,25,26,27. Because of the confusion in the identity of *Q. rubra* L., which has been applied to both the northern and southern red oaks, Rehder's proposal to reject this as a confused name is followed here.
(2) *Q. coccinea* Muench., scarlet oak. Range 21,22,23,24,25,26,27,28.
(3) *Q. ellipsoidalis* E.G. Hill, northern pin oak. Range 21,22,23,24.
(4) *Q. falcata* Michx., southern red oak (Spanish oak). Range 20,25,27,28,29,30. See note on *Q. rubra* L. under (1).
(5) *Q. palustris* Muench., pin oak. Range 21, 22,23,24,25,27,29.
(6) *Q. velutina* Lam., black oak. Range 20,22, 23,24,25,26,27,28,29,30.
(7) Other or unnamed species.

Large forest trees furnishing commercially important wood; also grown for shade, especially (1,2,5); (5) frequently used as a street tree; useful to wildlife.

Actinopelte dryina (Sacc.) Hoehn., leaf spot. Occasional, N.Y. to Ga., Okla., and Wis. (*).
Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Md., Mich.
Aleurodiscus spp., bark patch, sometimes on living trunks and branches. N.Y. to Fla., Tex., and Mo. (*). *A. acerinus* (Pers. ex Fr.) Hoehn. & Litsch., *A. candidus* (Schw.) Burt, and *A. oakesii* (Berk. & Curt.) Cke. are commonly reported.
Armillaria mellea Vahl ex Fr., root rot. Cosmopolitan, common on (2) and (6).
Articularia quercina (Pk.) Hoehn., on fallen leaves. Ill., Miss. (6).
Botryodiplodia ravenelii Sacc., twig blight. Ohio (2).
Botryosphaeria spp., on bark of dead branches, sometimes on dead leaves. Reports of *B. berengeriana* de N. and *B. fuliginosa* (Moug. & Nestl.) Ell. & Ev. probably refer mostly to *Physalospora obtusa*. *B. melanops* (Tul.) Wint., on dead branches. Conn. (1). *B. quercuum* (Schw. ex Fr.) Sacc.—N.Y. to Ga. and Mo. (1,2,4); regarded as distinct by some authorities but often confused with *P. obtusa*. *B. ribis* (Tode ex Fr.) Gross. & Dug.—Fla., Md., Pa., Va. (*).
Bulgaria inquinans Pers. ex Fr.: SEE *Phaeobulgaria inquinans*.
Cenangium tetrasporum (Ell.) Sacc., on dead twigs. N.J. (2).
Ceratostomella pluriannulata Hedgc., sapwood stain. Ind. (1), Miss. (4).
C. stenoceras Robak — in heartwood of living trees. N.Y., Va. (*).
Chalara quercina Henry, wilt, dieback. Ill., Iowa, Minn., Wis. (1,4,6); Ill., Mo. (5); Ind. (6).
Chlorociboria aeruginosa (Oed. ex Fr.) Seaver and *C. versiformis* (Pers. ex Fr.) Seaver, on dead wood, green stain. Cosmopolitan (*).
Chlorosplenium chlora (Schw.) Curt. (*C. schweinitzii* Fr.), on dead wood and bark. N.Y. to Ala. and Tenn. (*).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla., Mo., Okla., Tex. (*).
Coccomyces coronatus (Schum. ex Fr.) de N., on fallen leaves. Cosmopolitan.
C. triangularis (Schw. ex Fr.) Sacc., on twigs, ?dieback. Va. (1,4).
Collybia velutipes Fr., sapwood rot. Ind. (1).
Coniophora puteana (Schum. ex Fr.) Karst., dry rot of logs and timber. Ill., Iowa, Pa., Va. (1).
Coniothyrium truncisedum Vest., on twigs, ?dieback. Ill. (1,5,6).
Conopholis americana (L.f.) Wallr., parasitic on roots, "sqaw-root." Va. (1).
Corticium galactinum (Fr.) Burt, root rot. Md., Va. (1,5); Ark., Mo., Okla. (6).
C. lividum Pers. ex Fr., sprout butt rot. Md., N.C., Va. (1,5).
Coryneum kunzei Cda.: SEE *Pseudovalsa longipes*.
Coryneum pustulatum Pk., on branches. Mass., Mich., (1), Ark. (6).
Cronartium cerebrum Hedgc. & Long (=*C. quercuum* (Berk.) Miyabe?) (II,III), leaf rust. General with host from Mass. to Ga., Tenn., and Minn. (*), also Pacific coast on related hosts.
C. fusiforme Hedgc. & Long (II,III)—N.C., Va., W. Va. (1,2,4,5).
Cryptodiaporthe densissima (Ell.) Wehm., on branches. Mass. (1), N.J. (2).
Cuscuta spp., dodder. Occasional in forest nurseries (*).
C. exaltata Engelm.—Tex. (4).
Cylindrosporium kelloggii Ell. & Ev., leaf spot. Calif. (7).
C. microspilum Sacc. & Wint., leaf spot. Ill. (5).
Cytospora spp., on twigs, ?canker and dieback. Conidial stage of *Valsa* spp., q.v.
Daedalea quercina L. ex Fr., brown cubical rot of dead trunks, logs, and timber. Maine to N.C., Mo., and Minn. (*). Other species reported on dead trunks and logs, usually with white sapwood rot: *D. ambigua* Bres.—Fla. (4); *D. confragosa* Bolt. ex Fr. —N.Y. (1); Ark., La. (4); Nebr.; *D. farinacea* (Fr.) Overh.—Ark., La. (4); *D. unicolor* Bull. ex Fr.—Wis.
Daldinia spp., white streaked sapwood rot of logs and slash: *D. concentrica* (Bolt. ex Fr.) Ces. & de N. and *D. vernicosa* (Schw.) Ces. & de N. Cosmopolitan, the latter commonly on charred substrates.
Diaporthe leiphaemia (Fr.) Sacc. var. *raveneliana* (Thuem. & Rehm) Wehm., on dead branches, ?canker. Ill. (1,5), Md. (2).
Diatrype spp., on dead branches, sometimes associated with cankers, especially *D. stigma* Hoffm. ex Fr.—Cosmopolitan (*); *D. albopruinosa* (Schw.) Cke. & Ell.—Md., N.J. (1,2); Ark., Miss., Mo. (6).
Diatrypella quercina (Pers. ex Fr.) Nits., on dead branches. Maine (1). *D. subfulva* (Berk. & Curt.) Sacc.—Ga. (1).
Dichaena quercina Pers. ex Fr., on twigs and branches, ?canker. N.J. (2), Fla. (7). *D. strumosa* Fr., trunk and branch canker. N.J. (2,6), Va. (6).
Diplodia longispora Cke. & Ell., twig blight. Ohio (1); N.J., Va. (2).
Discohainesia oenotherae (Cke. & Ell.) Nannf., on fallen leaves. Va. (4,6).
Discosia artocreas Tode ex Fr., on fallen leaves. Ill., Maine (1,2).

Dothiorella phomiformis (Sacc.) Petr. & Syd., leaf spot. N.Y., Vt. (1).
D. advena Sacc.: See *Botryosphaeria melanops.*
D. quercina (Cke. & Ell.) Sacc.: See *Physalospora glandicola.*
Endothia gyrosa (Schw.) Fr., on exposed roots and dead branches, ?canker. N.C. to Ala., Ark., and Mich. (1,2,4,5,6). *E. parasitica* (Murr.) P.J. & H.W. Anderson, on dead branches. Conn., Ind. (6). *E. radicalis* (Schw. ex Fr.) Ces. & de N. (*E. fluens* (Sow. ex Fr.) Shear & N.E.Stevens)—Conn. to S.C., Ky., and Ind. (1,2,4,6).
Favolus alveolaris (DC. ex Fr.) Quél., white sapwood rot of logs and slash. Cosmopolitan.
Fistulina hepatica Huds. ex Fr., sprout butt rot, brown oak, "foxiness." N.J., Pa., Va., W. Va. (1,2,6).
Fomes spp., various wood rots, often on living trees:
F. applanatus (Pers. ex Wallr.) Gill., white-mottled butt and heart rot. Maine to Va., Ind., and Minn. (*).
F. connatus (Weinm. ex Fr.) Gill., butt and heart rot. Mass., Va. (1).
F. everhartii (Ell. & Gall.) Schrenk, white spongy heart rot, trunk canker. N.J. to N.C. and Minn. (*).
F. fomentarius (L. ex Fr.) Kickx, sapwood rot. N.C. (4).
F. igniarius (L. ex Fr.) Kickx—Maine to Minn. (1,2); N.C. (4). Often confused with *F. robustus*, to which these reports should at least in part be referred.
F. lobatus (Schw.) Cke.—N.Y. (1); W. Va. (6); Mo., Pa., Tex. (7).
F. robustus Karst., white heart rot. N.Y. (1). See note under *F. igniarius.*
Fomes spp., on dead wood: *F. calkinsii* (Murr.) Sacc. & D.Sacc.—La., Miss., N.C., Va. (*); *F. fraxineus* (Bull. ex Fr.) Cke.—Ill. (7); *F. geotropus* Cke.—La., Miss. (4,7). *F. marmoratus* (Berk. & Curt.) Cke.—Fla., Tex. (7); *F. ohiensis* (Berk.) Murr.—N.Y. to Va. and Iowa (*).
Fusicoccum ellisianum Sacc. & Syd., twig canker. Ill., Mass. (1); N.J. (6).
Ganoderma curtisii (Berk.) Murr., white butt and heart rot. Ind. (1), Md. (2,5), S.C. (4). *G. lucidum* (Leyss. ex Fr.) Karst.—Ind. (2), Va. (4). *G. sessile* Murr.—La. (3).
Gloeosporium spp., anthracnose, leaf spot: *G. canadense* Ell. & Ev., and *G. nervisequum* (Fckl.) Sacc., as reported on *Quercus*, = *G. quercinum* West., the conidial stage of *Gnomonia quercina*, q.v. *G. septorioides* Sacc. = *Marssonina quercina.*
Gnomonia quercina Kleb., anthracnose, leaf spot. General in Eastern and Central States (*), also Calif., Oreg. (7).
G. setacea (Pers. ex Fr.) Ces. & de N., on fallen leaves. Ga. (*).
Godronia tabacina (Cke.) Seaver, on dead twigs. N.J. (2).
Godroniopsis quernea (Schw.) Diehl & Cash, on twigs, ?canker. Ala., Conn., N.J. (2); N.J. (6).
Graphium rigidum Pers. ex Sacc., sapwood stain. Ind. (1,2). *G. rubrum* Rumbold—Ind. (1).
Hoplolaimus coronatus Cobb, root nematode. Del., Md., N.J., Pa. (1,5).
Hericium erinaceus (Bull. ex Fr.) Pers., white spongy heart and sapwood rot, wound rot of living trees. Specific reports from W. Va. (1), N.C. (6); probably occasional throughout the range.
Hymenochaete spp., on dead wood, usually fallen branches, sometimes associated with heart rot; the following commonly reported: *H. corrugata* (Fr.) Lév., *H. curtisii* (Berk.) Morg., *H. rubiginosa* (Schrad. ex Fr.) Lév., *H. tabacina* (Sow. ex Fr.) Lév.
Hypholoma sublateritium Fr., on dead wood, usually stumps or roots. Cosmopolitan.
Hypoxylon spp., on dead wood and bark or sometimes associated with cankers; the following commonly reported: *H. atropunctatum* (Schw. ex Fr.) Cke., *H. fragiforme* (Pers. ex Fr.) Kickx, *H. howieanum* Pk., *H. marginatum* (Schw.) Berk., *H. morsei* Berk. & Curt., *H. punctulatum* (Berk. & Rav.) Cke., *H. rubiginosum* Pers. ex Fr., *H. serpens* Pers. ex Fr., *H. truncatum* (Schw. ex Fr.) J.H.Miller.
Irpex cinnamomeus Fr. (=*I. fuscescens* Schw.?), white sapwood rot of dead trunks and branches. Maine to N.C., Mo., and Minn. (*). Also reported as *Hydnochaete olivaceum* Schw. ex Banker.
Lentinus tigrinus Bull. ex Fr., wound rot. N.Y. (6). Cosmopolitan on dead wood.
Lenzites betulina L. ex Fr., brown cubical rot of logs and stumps. Cosmopolitan.
Leptosphaeria dryophila (Cke. & Harkn.) Sacc., leaf spot. N.C. (6).
Leptothyrium dryinum Sacc.: See *Actinopelte dryina.*
Macrophoma dryina (Berk. & Curt.) Berl. & Vogl., on branches. Ill., Pa. (7).
M. phomiformis (Sacc.) Tassi: See *Dothiorella phomiformis.*
Marssonina quercina (Wint.) Lentz (including var. *major* Ell. & Ev.), brown-bordered leaf spot. N.Y. to Va., Nebr., and Wis. (1,2,3,6).
?M. quercus (Pk.) Magn. (=*M. martini* (Sacc. & Ell.) Magn.)—Wis. (6).
Merulius rubellus Pk., and *M. tremellosus* Schrad. ex Fr., wood rot usually of logs and slash, sometimes heart rot of living trees. General (*).
Microsphaera alni DC. ex Wint. (*M. quercina* (Schw.) Burr.), powdery mildew, usually on coppice and nursery plants. General (*). Also var. *extensa* (Cke. & Pk.) Salm.—Ill., Iowa, Ohio (1,3,5,6).
Monochaetia desmazieri Sacc., leaf blotch. Southeastern and South Central States to Ohio and Mass. (*). *M. taphrinicola* (Ell. & Ev.) Sacc., associated with *Taphrina* leaf blister, N.J. to Va., Tex., and Kans. (1,2,5).
Morenoella quercina (Ell. & Mart.) Th., black leaf spot, purple blotch. Ga., N.C., Tenn., Va. (*).
Mycosphaerella sp., on fading or fallen leaves: *M. maculiformis* (Pers. ex Fr.) Schroet.—Ga. (1,2); *M. catesbeyi* (Cke.) J.H.Miller—Ga., S.C. (7); *M. punctiformis* (Pers. ex Fr.) Schroet.—Ga., Mass. (1,6).
Myxosporium stellatum Dearn., on twigs. N.Y. (6).
Nectria cinnabarina Tode ex Fr., on twigs and branches, ?dieback. Ind., Pa., Va. (1,2); Ala. (4).
N. galligena Bres., trunk and branch canker. Conn., Mass., N.H., Vt., W. Va. (1,2).
N. mammoidea Phill. & Plowr., on dead branches. Md. (2), Ga. (6).
Nigrospora sphaerica (Sacc.) Mason, on twigs, ?dieback. Ill. (5).
Nummularia clypeus (Schw.) Cke. (*Hypoxylon mediterraneum* (de N.) J.H.Miller), on dead branches, sometimes associated with cankers. Ga., Ill., Ind., Ohio, Va. (1,2,6); Oreg. (7).
Peniophora spp., on dead wood, usually fallen branches; the following commonly reported: *P. aspera* (Pers.) Sacc., *P. cinerea* (Pers. ex Fr.) Cke., *P. velutina* (DC. ex Pers.) Cke.
Pestalotia spp., on fading or fallen leaves, secondary leaf spot: *P. clavispora* Atk.—Ala. (4). Ill. (6); *P. maura* Ell. & Ev.—Iowa (1), La., N.C. (4); *P. montellica* Sacc. & Vogl.—Pa. (6), N.C.; *P. quercina* Guba—Va. (6).
Phaeobulgaria inquinans (Pers. ex Fr.) Nannf., on bark of dead branches and trunks. Cosmopolitan.
Pholiota adiposa Fr., sprout butt rot. Va. (2).

Phoma aposphaerioides Briard & Har., twig canker. Ill. (1).

Phomopsis sp., trunk gall, tumor. Md., Tex., Va., Wis. (6).

P. glandicola (Lév.) Grove (=*Physalospora glandicola*?), dry rot of acorns. Md., N.Y. (6).

P. quercina (Sacc.) Hoehn.: SEE *Diaporthe leiphaemia.*

Phoradendron flavescens (Pursh) Nutt., mistletoe. Va. to Ala., Tex., and Mo. (4,6,7).

P. villosum Nutt.—Calif., Oreg. (7).

Phyllactinia corylea Pers. ex Karst., powdery mildew. Va. to S.C., Ill., and Wis. (1,2,5,6); Calif. (7).

Phyllosticta phomiformis Sacc.: SEE *Dothiorella phomiformis.*

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4,5).

Physalospora spp., on bark of dead branches. also on acorns and fallen leaves. More or less cosmopolitan but specific reports as follows: *P. glandicola* (Schw.) N.E.Stevens, ?canker. twig blight, dry rot of acorns. Mass. to Va., Ill., and Mich. (1,2,5,6); *P. obtusa* (Schw.) Cke.—N.C., Va. (6); *P. quercifolia* Ell. & Ev., on dead leaves. N.J., Va. (2); *P. rhodina* (Berk. & Curt.) Cke.—N.Y. to Fla., Ark., and Iowa. (*).

Phytophthora cactorum (Leb. & Cohn) Schroet., bleeding canker. Fla. (4).

P. cinnamomi Rands, root rot of seedlings. Md. (1).

Pleurotus spp., on dead wood or sometimes causing wound rot of living trees: *P. corticatus* Fr., *P. dryinus* Fr., and *P. ostreatus* Jacq. ex Fr. have been noted.

Polyporus spp., various wood rots; species often on living trees, causing butt or heart rot: *P. berkeleyi* Fr.—Mass. to N.C., Ark., and Wis. (*); *P. compactus* Overh.—Maine, Va. (1,2,6); *P. croceus* Pers. ex Fr.—Pa. to N.C., Ark., and Minn. (1,2,6); *P. dryadeus* Pers. ex Fr.—Md. to Tex. and Okla. (*); *P. frondosus* Dicks. ex Fr.—Mass. (1), Va. (4); *P. graveolens* Schw. ex Fr.—N.Y. to Ga. and Ohio (1,2,6); *P. obtusus* Berk.—Minn. (1), Ala. (4), N.C. (6), S.C. (7); *P. hispidus* Bull. ex Fr., trunk canker, white spongy heart rot—Conn. (1,2); N.Y. (6); *P. rheades* (Pers.) Fr., white pocket heart rot.—N.Y. to N.C. and Ark. (*); Calif., Oreg. (7); *P. spraguei* Berk. & Curt., brown crumbly heart rot—Mass. to Va. and Wis. (*); *P. sulphureus* Bull. ex Fr.—general (*).

Polyporus spp., usually on dead trunks and logs, or sometimes causing wound rot of living trees; distribution as noted or cosmopolitan: *P. adustus* Willd. ex Fr.; *P. albellus* Pk.—Maine (1); *P. biformis* Klotzsch—Ind. (1); *P. caesius* Schrad. ex Fr.; *P. cinnabarinus* Jacq. ex Fr.; *P. cuticularis* Bull. ex Fr.—Md. (5); *P. delectans* Pk.; *P. dichrous* Fr.—Maine (1); *P. distortus* Schw. ex Fr. —Ill. (5); *P. galactinus* Berk.—Md. (4); *P. gilvus* (Schw.) Fr.—N.Y. (1,6); Md., Va. (4); *P. hirsutus* Wulf. ex Fr.; *P. pargamenus* Fr.; *P. pocula* (Schw.) Berk. & Curt.—Mo. (6): *P. rigidus* Mont. —Md. (4); *P. rutilans* Pers. ex Fr.—N.Y. (6); *P. sanguineus* L. ex Fr.—La. (5); *P. sector* Ehr. ex Fr.—La. (5); *P. semipileatus* Pk.—Wis. (1); *P. semisupinus* Berk. & Curt.—N.Y. (6); *P. tulipiferus* (Schw.) Overh.; *P. versicolor* L. ex Fr.

Poria spp., various wood rots, usually on dead trunks and branches, sometimes heart rot of living trees: *P. andersonii* (Ell. & Ev.) Neuman—Va. and N.C. to Mo. and Ill. (1,2,6); *P. cocos* Wolf—Va., W. Va. (1,2,6); *P. eupora* (Karst.) Cke.—Mich. (1); *P. incrassata* (Berk. & Curt.) Burt, dry rot of timber —cosmopolitan; *P. nigra* Berk.—Conn., Ill., Va. (1,2,6); *P. purpurea* (Fr.) Cke.—Mo. (6); *P. spiculosa* Campbell & Davidson—N.C., Va. (4); *P. unita* (Pers.) Cke.—Ind., Mich. (1,6); *P. versipora* Pers. ex Rom.—Md. (4).

Pratylenchus sp., meadow nematode, in roots. Md. (1,5).

Pseudovalsa longipes (Tul.) Sacc., canker, dieback. N.J. to Ga., Mo., and Wis. (*).

Ptychogaster cubensis Pat. (=*Polyporus rickii* (Pat.) Sacc. & Trott.?), brown heart rot. Fla. (7).

Pyrenochaeta minuta J.C.Carter, twig canker. Ill. (5).

Ramularia crypta Cke., on fallen leaves. S.C. (4).

Rhizoctonia sp. (*?R. solani* Kuehn), thread blight of seedlings. Ind. (6).

Rhodosticta quercina J.C.Carter, on dead twigs. Ill. (5).

Schizophyllum commune Fr., on dead branches. Md., N.Y., Va. (1,5); probably general but not common on oak.

Septobasidium spp., brown felt on scale-infested branches: *S. burtii* Lloyd — N.C. (5); *S. cokeri* Couch—N.C. (4), N.J. (6); *S. pseudopedicellatum* Burt—N.J. (2).

Septogloeum defolians Harkn., leaf spot. Calif. (on *Q. kelloggii* Newb.).

Septoria dryina Cke., on fading leaves. S.C. (4). *S. querceti* Thuem.—Iowa (1), S.C. (6). *S. quercicola* (Desm.) Sacc.—Minn., N.C., Pa. (1); Oreg. (7).

Sphaerognomonia polystigma (Ell. & Ev.) Thompson & J.H.Miller, on fallen leaves. Ga. (1,2,5,6); Ohio (2).

Sphaeropsis sp. (*?S. quercina* Cke. & Harkn.—an invalid name), twig canker. Ill. (1), Calif. (7). SEE ALSO *Macrophoma, Phoma,* and *Physalospora.*

Sphaerotheca lanestris Harkn., brown mildew. N.C. (1), Miss. (4), Calif. (7).

Steccherinum ochraceum (Pers. ex Fr.) S.F.Gray, wood rot. Ind. (2), Mo. (4); probably general. *S. septentrionale* (Fr.) Banker—Mich., N.Y. (2).

Stereum spp., various wood rots: *S. frustulosum* Pers. ex Fr., *S. gausapatum* Fr., and *S. subpileatum* Berk. & Curt.—sprout butt rot and white pocket heart rot. Pa. to Va., Ark., and Mo. (*). Other species commonly noted on logs, stumps, and dead branches: *S. fasciatum* Schw., *S. fuscum* Schrad. ex Quél.. *S. hirsutum* Willd. ex Fr., *S. rameale* Schw., *S. umbrinum* Berk. & Curt.

Strumella coryneoidea Sacc. & Wint., trunk canker. Minn., Pa. (1); Conn. (5); Mass. (6). Conidial stage of *Urnula craterium* (Schw.) Fr.

Taphrina caerulescens (Mont. & Desm.) Tul. (including *T. rubrobrunnea* (Pk.) Sacc.), leaf blister. General (*).

Trametes morgani Lloyd, wood rot. Ind., Ohio, Va. (1,2,6).

Ustulina deusta (Hoffm. ex Fr.) Petr. (*U. vulgaris* Tul.), on dead wood, ?canker, butt rot. Ga., Va. (1); Ind., Iowa, Mo. (2).

Valsa intermedia Nits.. on dead branches, ?canker, dieback. Ill. (1,5,6).

V. lutescens Ell.—Miss., N.J., Tenn. (2,6).

Valsaria exasperans (Gerard) Ell. & Ev., on dead branches. Cosmopolitan.

Venturia asterinoides Ell. & Mart., on fallen leaves. Ga. (1,4,6,7).

V. orbicula Cke. & Pk.—N.J., N.Y., Va. (1,2).

Volvaria bombycina Pers. ex Fr., wound rot. Ga. (4).

Xylaria hypoxylon (L. ex Fr.) Grev., on dead wood. Ga. (2) Mo. (6).

CHLOROSIS — physiological, usually attributed to iron deficiency; N.J. to Tex. and Mich., especially the North Central States (5).

VI. Water and Willow Oaks

(1) *Quercus imbricaria* Michx., shingle oak. Range 22,23,24,25,27,28.

(2) *Quercus laurifolia* Michx., laurel oak. Range 20,28,29,30.
(3) *Q. marilandica* Muench., blackjack oak. Range 16,19,20,22,24,25,27,28,29,30.
(4) *Q. nigra* L., water oak. Range 17,20,25, 28,29,30.
(5) *Q phellos* L., willow oak. Range 20,25,27, 28,29,30.

Mostly large trees furnishing wood of some commercial importance; also grown under cultivation, especially (4) and (5), for shade and ornament; useful to wildlife.

(6) Other or unnamed species.

Actinopelte dryina (Sacc.) Hoehn., leaf spot. Okla., W. Va. (3); Ga., Miss., Okla., Tex. (4); N.C., S.C. (5).

Armillaria mellea Vahl ex Fr., root and butt rot. Fla. (2), La. (4).

Asterina spp., black mildew or sooty mold: See *Calothyrium* and *Microthyriella*.

Calothyrium pustulatum (Ell. & Martin) Th., and *C. stomatophorum* (Ell. & Martin) Th., on living or fallen leaves. Fla. (2).

Chaetophoma quercifolia Cke., on leaves. S.C. (4).

Chalara quercina Henry, wilt. Iowa, Mo. (1).

Clitocybe tabescens (Scop. ex Fr.) Bres., mushroom root rot. Fla. (2,4,7), Okla. (4).

Coccomyces coronatus (Schum. ex Fr.) de N., on fallen leaves. Fla., Ga., N.C. (4).

Conopholis americana (L.f.) Wallr., parasitic on roots, "squaw-root." Fla. (2).

Coronophora ootheca (Berk. & Curt.) Sacc., on dead branches. Ga. (4), N.C. (6).

Coryneum kunzei Cda.: See *Pseudovalsa longipes*.

Cronartium cerebrum Hedgc. & Long (II,III), leaf rust. Conn. to Fla., Tenn., and Ark. (1,3,4,5). O and I on 2- and 3-needle *Pinus* spp.

C. fusiforme Hedgc. & Long (II,III)—Ala. (2), N.C. (2,4), Fla. (7). O and I on longleaf pines (*Pinus caribaea, P. palustris, P. taeda*).

C. strobilinum Hedgc. & Hahn (II,III)—Fla. (2,4). O and I on longleaf pines. These 3 species are regarded by some authorities as forms of *C. quercuum* (Berk.) Miyabe.

Cylindrosporium quercinum J.C.Carter, on twigs. Ill. (1).

Daedalea ambigua Bres., wood rot. Fla. (6). *D. unicolor* Bull. ex Fr.—Ga. (6).

Diatrype stigma Hoffm. ex Fr., on dead branches. Ind. (3), Ga. (4). Kans. (5). *D. virescens* (Schw.) Cke.—Ohio (3).

Diatrypella favacea (Fr.) Nits., on dead branches. Ga. (4). *D. quercina* (Pers. ex Fr.) Nits.—Ga. (4).

Dichaena strumosa Fr., branch canker. Ga., N.C. (4).

Dictyothyrium subcyaneum (Ell. & Martin) Th., on leaves. Fla. (2).

Didymella lophospora Sacc. & Speg., on fallen leaves. Ga. (4), Ohio (6).

Dothiorella quercina (Cke. & Ell.) Sacc.: See *Physalospora glandicola*.

Echidnodes liturae (Cke.) Th. & Syd., on leaves. Ga., Tex. (4).

Endothia gyrosa (Schw.) Fr., on branches and exposed roots. Ind. (1,3); Gulf States to N.C. and Tenn. (4,5). *E. radicalis* (Schw. ex Fr.) Ces. & de N.—Ky. (3), S.C. (4).

Fomes spp., various wood rots, sometimes butt rot or heart rot of living trees; *F. applanatus* (Pers. ex Wallr.) Gill.—Md. (1), Fla. (2), Ind. (3); *F. australis* Cke.—Fla. (2); *F. calkinsii* (Murr.) Sacc. & D.Sacc. (=*F. robustus?*)—Fla. (2); *F. everhartii* (Ell. & Gall.) Schrenk, white spongy heart rot—Ind. (1), N.J. (3); *F. fomentarius* (L. ex Fr.) Kickx—Va. (3); *F. geotropus* Cke.—Fla. (2), La., Miss. (4); *F. igniarius* (L. ex Fr.) Kickx—Tex. (3); *F. lobatus* (Schw.) Cke.—Tex. (3); *F. marmoratus* (Berk. & Curt.) Cke.—Fla. (2,4), Tex. (4); *F. robustus* Karst.—La. (4).

Ganoderma curtisii (Berk.) Murr., white spongy butt rot. Fla. (2), Va. (5). *G. lucidum* (Leyss. ex Fr.) Karst.—Fla. (2), La., Miss. (4). *G. sessile* Murr.—S.C. (4).

Gloeosporium septorioides Sacc.: See *Marssonina quercina*.

Gnomonia clavulata Ell., on fallen leaves. N.J. (3). *G. setacea* (Pers. ex Fr.) Ces. & de N.—Ga. (3).

Godroniopsis quernea (Schw.) Diehl & Cash, on twigs, ?canker. Fla. (2,5), N.C. (5).

Hericium erinaceus (Bull. ex Fr.) Pers., white spongy heart rot. Fla. (2,4); La., Miss. (4); N.C. (5).

Hymenochaete curtisii (Berk.) Morg., wood rot. La., Miss. (3).

Hypoderma ilicinum de N., on leaves. Tex. (3); Ala., Ga. (4).

Hypoxylon spp., on dead wood, sapwood rot, the following commonly reported: *H. atropunctatum* (Schw. ex Fr.) Cke., *H. marginatum* (Schw.) Berk., *H. punctulatum* (Berk. & Rav.) Cke., *H. truncatum* (Schw. ex Fr.) J.H.Miller.

Irenina manca (Ell. & Ev.) F.L.Stevens, black mildew. Miss. (7).

Irpex cinnamoneus Fr. (*I. fuscescens* Schw.?), wood rot. Fla., La., Miss. (4).

Lentinus tigrinus Bull. ex Fr., sapwood rot, sometimes heart rot following fire damage. La., Miss. (4).

Lenzites betulina L. ex Fr., brown cubical heart rot. Md. (5).

Leptophyma aurantiaca (Ell. & Martin) Sacc., on fallen leaves. Fla. (2).

Leptostroma querci Tehon, leaf spot. Ill. (1).

Marssonina quercina (Wint.) Lentz, leaf spot. Ill., Md., Mo., N.J., Ohio (1); Ala., Okla. (4); Md. (5).

Merulius tremellosus Schrad. ex Fr., sapwood and sometimes heart rot following fire damage. La., Miss. (4).

Microsphaera alni DC. ex Wint. (*M. quercina* (Schw.) Burr.), powdery mildew. General (*). Var. *calocladophora* (Atk.) Salm.—Ala., Fla., S.C. (2,4); var. *extensa* (Cke. & Pk.) Salm.—Mo. (1), S.C. (4).

Microstroma album (Desm.) Sacc., on fallen leaves. Mo. (1).

Microthyriella discoidea (Ell. & Martin) Th. and M. *patelloides* (Ell. & Martin) Th., on living or fallen leaves. Fla. (2). *M. intricata* (Ell. & Martin) Th.—Fla. (5).

Monochaetia desmazieri Sacc., leaf blotch. Ark., Tenn. (3); Ga., N.C. (4); Fla. (7). *M. taphrinicola* (Ell. & Ev.) Sacc.—Miss. (4).

Morenoella quercina (Ell. & Martin) Th., leaf blotch. Ga. (2), N.C. (3,5), Fla. (4,7).

Mycosphaerella aguatica (Cke.) J.H.Miller, on fallen leaves. Ga., S.C. (4). *M. punctiformis* (Pers. ex Fr.) Schroet.—Ga. (3,4,5).

Nectria cinnabarina Tode ex Fr., on twigs, ?canker and dieback. Ala., Ga., Miss. (4).

Nummularia clypeus (Schw.) Cke., on branches. Ga. (4).

Panus stipticus Fr., on dead wood, sapwood rot of logs. La., Miss. (4).

Passalora melioloides Tracy & Earle, black leaf spot. Fla. (2,7).

Phaeosaccardinula martini (Ell. & Sacc.) Hoehn., on leaves. Fla. (2).

Phoma dendritica Thuem., on fading leaves. S.C. (4).

Phoradendron flavescens (Pursh) Nutt., mistletoe. Gulf States to Va. and Mo. (*, especially 4).

Phyllactinia corylea Pers. ex Karst. (including var. *macrospora* Atk.), powdery mildew. Tex. (3); Ala., Fla., Ga., Ohio, S.C. (4); Ala. (5).

Phyllosticta spp., on fading leaves or causing distinct leaf spots: *P. livida* Ell. & Ev.—Fla. (4); *P. ludoviciana* Ell. & Martin—La. (4); *P. neuroterigallicola* Tehon—Ill. (1); *P. vesicatoria* Thuem.—S.C. (7).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (5).

Physalospora glandicola (Schw.) N.E.Stevens, twig canker, dieback. Ill. (3). *P. obtusa* (Schw.) Cke., on dead branches—Ala. (4).

Pleurotus ostreatus Jacq. ex Fr., sapwood rot, wound rot. La., Miss. (4).

Polyporus spp., various wood rots; species sometimes on living trees, causing butt or heart rot: *P. dryadeus* Pers. ex Fr.—Md. to Fla. and Tex. (1,4). *P. fissilis* Berk. & Curt.—Fla. (2); Ark., La., Miss. (4); *P. glomeratus* Pk.—Fla. (2); *P. graveolens* (Schw.) Fr.—Ala. (4); *P. hispidus* Bull. ex Fr.—Fla. (2); La., N.C. (5); *P. ludovicianus* (Pat.) Sacc. & Trott.—Fla. (2); La., Miss. (4); *P. obtusus* Berk.—Fla. (2); Md., N.C. (3); *P. rheades* (Pers.) Fr., white pocket heart rot — La., Mo., Okla. (3); Tex. (3,4,5); *P. spraguei* Berk. & Curt. —Ind. (3); *P. sulphureus* Bull. ex Fr.—Fla. (2), La. (5); *P. zonalis* Berk.—Fla. (2); La., Miss. (4).

Polyporus spp., usually on dead wood; distribution cosmopolitan or as indicated: *P. gilvus* (Schw.) Fr.; *P. hirsutus* Wulf. ex Fr.; *P. licnoides* Mont.—Fla. (2); *P. pargamenus* Fr.; *P. sanguineus* L. ex Fr.; *P. sector* Ehr. ex Fr.—Fla. (2), La. (4), Tex. (5); *P. tulipiferus* (Schw.) Overh.; *P. versicolor* L. ex Fr.

Poria spp., wood rot, usually of logs and fallen branches, sometimes heart rot of living trees: *P. andersonii* Ell. & Ev.—Tex. (4); *P. cocos* Wolf, on roots—Fla. (5); *P. inflata* Overh.—La., Miss. (4); *P. semitincta* (Pk.) Cke.—Pa. (1,3); *P. spiculosa* Campbell & Davidson—N.C. (3,4,5), Del., Va. (5); *P. unita* (Pers.) Cke.—Ill. (4).

Pseudovalsa longipes (Tul.) Sacc., twig canker, dieback. Ill., Iowa (1).

Ptychogaster cubensis Pat. (=*Polyporus rickii* (Pat.) Sacc. & Trott.?), heart rot. Fla. (4), La. (5).

Rhizoctonia sp. (*?Pellicularia filamentosa* (Pat.) Rogers), thread blight. Ind. (4).

Septobasidium spp., on scale-infested branches, brown felt: *S. alni* Torrend—S.C. (4,5); *S. burtii* Lloyd —Fla., Ga., S.C. (4); *S. castaneum* Burt—Fla. (2,4); La., S.C. (4,5); *S. cokeri* Couch — Tenn. (1); Fla. (2,7), N.C. (5); *S. curtisii* (Berk. & Desm.) Boed. & Steinm.—Fla. (4), Ark. (5); *S. pseudopedicellatum* Burt—Fla. (2,4). N.C., S.C. (4); *S. sinuosum* Couch — Fla. (2,4); *S. tenue* Couch—Fla. (2).

Septoria spp., on fading leaves, leaf spot: *S. neglecta* Earle—Ala. (5); *S. quercicola* Sacc. var. *cinerea* Ell. & Ev.—Fla. (7); *S. serpentaria* Ell. & Martin —Fla. (2).

Sphaerognomonia polystigma (Ell. & Ev.) Thompson & J.H.Miller, on fallen leaves. Ga. (3,4,7).

Stagonospora septorioides Ell. & Ev., on leaves. Miss. (1).

Stereum spp., various wood rots, usually on dead wood, sometimes heart rot of living trees: *S. fasciatum* Schw.—Tex. (4,5); *S. frustulosum* Pers. ex Fr. —Ind. (5); *S. fuscum* Schrad. ex Quél.—Tex. (4, 5); *S. gausapatum* Fr.—Md. (3), La. (4); *S. rameale* Schw.—general; *S. subpileatum* Berk. & Curt., white pocket heart rot — Md. (3), Ark., Miss. (5).

Strumella coryneoidea Sacc. & Wint., canker. Ill. (4).

Taphrina caerulescens (Mont. & Desm.) Tul., leaf blister. General (*).

Trabutia quercina (Fr. & K. Rudolphi) Sacc. & Roum., tar spot. Ala. (2,5), Fla. (2,7), Miss. (2,4).

Trametes hydnoides Fr., wood rot. Tex. (5). *T. rigida* Berk. & Mont.—Fla. (2); T. *tenuis* Karst.—Ind. (4).

Tryblidiella rufula (Spreng. ex Fr.) Sacc., on dead branches. Ala., Fla., Ga. (4).

Venturia asterinoides Ell. & Martin and *V. cupulata* Ell. & Martin, on fallen leaves. Fla. (2).

LEPROSIS (scaly bark)—cause unknown. Fla. (2).

VII. Live Oak Group

(1) *Quercus agrifolia* Née, California live oak. Range 1,5.

(2) *Q. chrysolepis* Liebm., canyon live oak. Range 1,4,10,11,14.

(3) *Q. virginiana* Mill., southern live oak. Range 11,16,17,20,25,29,30,31. Including var. *geminata* (Small) Sarg. Range 29,30.

(4) *Q. wislizenii* A.DC., interior live oak. Range 4,5,10.

(5) Other species.

Large evergreen trees, becoming shrubby in exposed sites and forming extensive ground cover; widely used for shade and as specimen trees in the South and California; useful to wildlife.

Acantharia echinata (Ell. & Ev.) Th. & Syd., black leaf spot. Calif. (2,4,5).

Aleurodiscus acerinus (Pers. ex Fr.) Hoehn. & Litsch., bark patch. Tex. (3). *A. candidus* (Schw.) Burt —Calif. (2). *A. disciformis* (DC. ex Fr.) Pat.— Calif. (2).

Armillaria mellea Vahl ex Fr., root rot. Calif. (1).

Botryosphaeria quercuum (Schw. ex Fr.) Sacc., on dead branches. Calif. (1), Ga. (3).
Ascochyta quercuum (Cke.) Sacc.: SEE *Diplodina quercuum*.

Cercospora macrochaeta Ell. & Ev., leaf spot. Calif. (2). *C. polytricha* Cke.—Ga., S.C. (3).

Chaetophoma quercifolia Cke., on leaves. Calif. (1).

Coccomyces coronatus (Schum. ex Fr.) de N., on fallen leaves. Calif. (1), N.C. (3).

Cronartium californicum Hedgc. (II,III), leaf rust. Calif. (1,2,4). A nomen nudum. O and I unknown.

C. cerebrum Hedgc. & Long (II,III)—Calif. (1); Va. to Fla. and Tex. (3). O and I on 2- and 3-needle *Pinus* spp.

C. conigenum Hedgc. & Hunt (II,III)—Ariz. (on *Q. emoryi* Torr. and *Q. hypoleuca* Engelm.). O and I on *Pinus leiophylla*.

C. fusiforme Hedgc. & Hahn (II,III), and *C. strobilinum* Hedgc. & Hahn (II,III)—Fla., Ga., Miss. (3). O and I on *Pinus caribaea* and *P. palustris*. This and the preceding three rusts are regarded by some authorities as forms of *C. quercuum* (Berk.) Miyabe.

Cuscuta exaltata Engelm., dodder (on seedlings). Tex. (3).

Cylindrosporium kelloggii Ell. & Ev., leaf spot. Calif. (1).

Daedalea ambigua Bres., wood rot. Ga., La. (3).

Dichaena quercina Pers. ex Fr., on branches, ?canker. Calif. (1).

Diplodia longispora Cke. & Ell., twig blight. Tex. (3).

Diplodina quercuum (Cke.) Tracy & Earle, on leaves. Miss. (3).

Dothidella janus (Berk. & Curt.) Hoehn., leaf spot. Fla., Tex. (3).

Dothiorella sp. (*?quercina* (Cke. & Ell.) Sacc.), on twigs, ?canker. Calif. (1).
Endothia gyrosa (Schw.) Fr., on dead branches and exposed roots. Calif. (1); Fla., Ga., Miss. (3). *E. singularis* (Schw.) Shear & N.E.Stevens—Calif. (1).
Erysiphe trina Harkn., powdery mildew, witches'-broom. Calif. (1).
Fomes applanatus (Pers. ex Wallr.) Gill., white-mottled butt and heart rot. Calif. (1). *F. australis* Cke.—Fla. (3). *F. calkinsii* (Murr.) Sacc. & D. Sacc. (=*F. robustus* Karst.?)—Fla., N.C. (3). *F. igniarius* (L. ex Fr.) Kickx—La. (3). *F. marmoratus* (Berk. & Curt.) Cke.—Fla.
Ganoderma curtisii (Berk.) Murr., white spongy butt and heart rot. Fla., Tex. (3). *G. lucidum* (Leyss. ex Fr.) Karst.—Fla., Tex. (3). *G. polychromum* (Copeland) Murr.—Calif. (1).
Gloeosporium quernum Harkn. (= *G. quercinum* West.?), leaf and twig blight. Calif. (1). Perhaps a synonym of *Gnomonia quercina*.
Gnomonia auercina Kleb., anthracnose. Oreg., ?Calif. (1); Miss. (3).
Godroniopsis quernea (Schw.) Diehl & Cash, on twigs. Ala., Fla. (3).
Hericium laciniatum Leers ex Banker, wood rot. Calif. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Hymenochaete rubiginosa (Dicks. ex Fr.) Lév., wood rot. Calif. (1).
Hypoderma ilicinum DeN., on leaves. Fla., Ga. (3).
Hypoxylon spp., on dead wood, sapwood rot: the following noted: *H. marginatum* (Schw.) Berk.—Fla. (3); *H. occidentale* Ell. & Ev.—Calif. (1); *H. punctulatum* (Berk. & Rav.) Cke.—Ga. (3); *H. truncatum* (Schw. ex Fr.) J.H.Miller—Ga. (3).
Irpex owensii Pk., on dead wood. Oreg. (1).
Laestadia auripunctum Harkn., leaf spot. Calif. (2,4).
Lentinus lecomtei Schw., sapwood rot. Fla. (3). *L. ursinus* Fr., on dead wood. Calif. (1).
Lenzites betulina L. ex Fr., brown cubical wood rot. Calif. (1,2).
Leptosphaeria dryophila (Cke. & Harkn.) Sacc., leaf spot. Calif. (1).
Leptothyrium californicum Bub., leaf spot. Calif. (5).
Meloidogyne sp., root knot nematodes. Calif. (1).
Microsphaera alni DC. ex Wint., powdery mildew. Calif. (1); Fla., Miss., Tex. (3).
Monochaetia desmazieri Sacc., leaf spot. Calif. (5); Fla., Tenn., Tex. (3). *M. taphrinicola* (Ell. & Ev.) Sacc.—La., Miss. (3).
Morenoella quercina (Ell. & Martin) Th., leaf blotch. S.C. to Fla. and La. (3).
Mycosphaerella aquatica (Cke.)—J.H.Miller, on fallen leaves. Ga. (3). *M. caespitosa* Ell. & Ev.—Calif. (2); Fla., Tex. (3).
Nummularia clypeus (Schw.) Cke., on dead branches. Calif., Oreg. (1).
Passalora melioloides Tracy & Earle, black leaf spot. Fla., S.C. (3).
Peniophora cinerea (Pers. ex Fr.) Cke., wood rot. Calif. (1).
Phaeobulgaria inquinans (Pers. ex Fr.) Nannf., on dead branches. Calif. (1).
Phaeosaccardinula martini (Ell. & Sacc.) Hoehn., on leaves. Miss. (3).
Phleospora hanseni Bub., leaf spot. Calif. (5).
Phoma discosiiformis Cke. & Harkn., on leaves. Calif. (1).
Phomopsis glandicola (Lév.) Grove, dry rot of acorns. Fla. (3).
Phoradendron flavescens (Pursh) Nutt., mistletoe. General (3).
P. villosum Nutt.—Calif., Oreg. (1,2,4).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Calif. (1).
Phyllosticta spp., leaf spot or on fading leaves: *P. agrifolia* Ell. & Ev.—Calif. (1,2); *P. livida* Ell. & Ev.—Fla. (3); *P. quercus-ilicis* Sacc.—Miss. (3); *P. virens* Ell. & Langl.—La., Miss. (3); *P. wislizenii* Ell. & Ev.—Calif. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3). Resistant.
Physalospora agrifolia Ell. & Ev., on leaves. Calif. (1).
Phytophthora cactorum (Leb. & Cohn) Schroet., bleeding canker. Calif. (1).
Pleurotus petalloides Bull. ex Fr. Ariz. (5).
Polyporus rheades (Pers.) Fr. (*P. dryophilus* Berk.), white pocket heart rot. Calif., Oreg. (1,2,4); Tex. (3); Ariz., N. Mex. (5). *P. sulphureus* Bull. ex Fr., brown cubical heart rot. Calif. (1,2,4); Fla., S.C., Tex. (3). Other species, usually on dead wood: *P. dichrous* Fr.—Calif. (1); *P. gilvus* (Schw.) Fr.—Calif. (1); Fla., Tex. (3); Ariz. (5); *P. ludovicianus* (Pat.) Sacc. & Trott.—Fla., La.; *P. obtusus* Berk.—Ariz. (5); *P. pargamenus* Fr.—La. (3); *P. persicinus* Berk. & Curt.—Fla. (3); *P. sector* Ehr. ex Fr.—Tex. (3); *P. supinus* Sw. ex Fr.—Ala., Fla., La. (3); *P. versicolor* L. ex Fr.—Calif., Oreg. (1).
Poria andersonii (Ell. & Ev.) Neuman, white spongy heart rot. Calif. (1). *P. unita* (Pers.) Cke.—Calif. (1); Fla., S.C. (3). *P. versipora* Pers. ex Rom.—Calif. (1).
Ptychogaster cubensis Pat., white heart rot. Fla. (3).
Pseudovalsa longipes (Tul.) Sacc., twig canker, dieback. Calif. (1), Tex. (3).
Saccardia quercina Cke., on fading leaves. Ga. (3).
Schizophyllum commune Fr., sapwood rot. Calif. (1).
Septobasidium canescens Burt, on scale-infested branches, brown felt. Calif. (1).
Septoria auercicola (Desm.) Sacc., leaf spot. Calif. (1), Fla. (3).
Shaeropsis quercina Cke. & Harkn., on branches. Calif. (1). *S. quercina* Pk. has priority.
Sphaerotheca lanestris Harkn., brown mildew. Calif. (1).
Stagonospora virens Ell. & Martin, on leaves. Fla. (3).
Steccherinum ochraceum (Pers. ex Fr.) S.F.Gray, wood rot. Calif. (1).
Stereum spp., various wood rots, usually on dead trunks and branches, sometimes heart rot of living trees: *S. fasciatum* Schw.—Calif. (1), Fla. (3); *S. gausapatum* Fr.—Calif. (1); *S. hirsutum* Willd. ex Fr.—Calif. (1), Ariz. (5); *S. rugosum* Pers. ex Fr.—Calif. (1); *S. subpileatum* Berk. & Curt.—white pocket heart rot. Fla. (3).
Taphrina caerulescens (Mont. & Desm.) Tul., leaf blister. Calif. (1); Fla., Ga., S.C., Tex. (3).
Trabutia quercina (Fr. & K.Rudolphi) Sacc. & Roum., tar spot. Fla., Miss., S.C. (3). *T. erythrospora* (Berk. & Curt.) Th. & Syd.—Calif. (1,2); Ariz. (2); Fla., Tex. (3).
Trametes hydnoides (Sw. ex Fr.), wood rot. Fla., Va. (3).
Dieback—cause unknown. Tex. (3).

VIII. Cultivated Oaks, Introduced Species

(1) *Quercus cerris* L., turkey oak. Native of southern Europe and western Asia; cultivated, zone 6.
(2) *Q. robur* L., English oak. Native of western Europe to Asia and northern Africa; cultivated, zone 4.
(3) *Q. suber* L., cork oak. Native of southern Europe and northern Africa, source of

cork; cultivated to a limited extent in California.

(4) Other species.

Coccomyces coronatus (Schum. ex Fr.) de N., on fallen leaves. Md. (1).

Cytospora chrysosperma Pers. ex Fr., twig canker, dieback. N.J., R.I. (2).

Daedalea quercina L. ex Fr., brown-checked heart rot. N.Y. (2).

Dothiorella quercina (Cke. & Ell.) Sacc., twig blight. Md. (2).

Endothia gyrosa (Schw.) Fr., on dead branches. S.C. (2,3).

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Marssonina martini (Sacc. & Ell.) Magn., leaf spot. Ill., Ind., Iowa, Va. (2).

Meloidogyne sp., root knot nematodes. Calif. (3).

Microsphaera alni DC. ex Wint., powdery mildew. Conn., Ill., Ind., Iowa, Md., N.Y. (2). Var. *extensa* (Cke. & Pk.) Salm.—Ky. (2).

Mycosphaerella punctiformis (Pers. ex Fr.) Schroet., leaf spot. Mass., Va. (2).

Nummularia clypeus (Schw.) Cke., on twigs, ?canker. Md. (2).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).

Polyporus versicolor L. ex Fr. wound rot. N.Y. (2).

Sphaeropsis sp. (*?S. quercina* Cke. & Ell.=*Physalospora glandicola* (Schw.) N.E. Stev.), twig blight. Ohio (2).

Sphaerotheca lanestris Harkn., brown mildew. Calif. (2,3).

FLACOURTIACEAE

Azara

A. microphylla Hook., aromo.

Evergreen shrub of Chile, grown for ornament in California.

Sclerotium rolfsii Sacc., stem rot. Calif.

Oncoba

O. spinosa Forsk.

Tropical shrub grown for ornament in California and Texas.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

FOUQUIERIACEAE

Fouquieria

F. splendens Engelm., ocotillo, candlewood.

Tall thorny shrub of deserts in the Southwest, sometimes grown for ornament and for hedges.

Aecidium cannonii Griff. (O,I), rust. Ariz.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

FUMARIACEAE

Corydalis

(1) *C. aurea* Willd.

(2) *C. sempervirens* (L.) Pers.

(3) Other species.

Mostly native woodland herbs, annual or biennial, in the Eastern and Central States and westward; also several introduced perennials; grown for ornament.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Fla. (3).

Peronospora corydalis d By., downy mildew. Ind. (1); Md. (2,3); Mass. (2); Okla., Tex. (3). This species or perhaps var. *intermedia* Gäum. also in Kans. (1,2,3); Nebr. (3).

Puccinia aristidae Tracy (O,I), rust. Colo., Kans., Nebr. (1,3). II and II on *Aristida* and *Distichlis*.

P. brandegei Pk. (III). Colo., Wash. (3).

Septoria corydalis Ell. & J. J. Davis, leaf spot. Wis. (2), Tex. (3).

Dicentra

(1) *D. canadensis* Walp., squirrelcorn.

(2) *D. cucullaria* (L.) Bernh., Dutchmans-breeches.

Perennial herbs of woodlands in the Northeastern and North Central States, sometimes grown in wild gardens.

(3) *D. spectabilis* DC., bleedingheart.

Hardy perennial herb of Japan, long cultivated for ornament.

Cerotelium dicentrae (Trel.) Mains & F. W. Anderson (O, I), rust. N.Y. to Md., Kans., and S. Dak. (2). II and III on *Urticastrum divaricatum*.

Fusarium sp., wilt. N.J. (3).

Peronospora dicentrae Syd. ex Gäum., downy mildew. Ind., Md., Mich., Mo., N.Y., Va., Wis. (1,2). Initially reported as *P. corydalis* d By.

Sclerotinia sclerotiorum (Lib.) d By., wilt, root rot in storage. Minn. (3).

Sclerotium rolfsii Sacc., stem rot. N.Y. (3).

GENTIANACEAE

Eustoma

(1) *E. russellianum* Griseb., prairiegentian, Texas-bluebell.

(2) Other species.

Annual herb of prairies from Nebraska to Texas; sometimes grown in gardens.

Alternaria sp., stem blight (? secondary). Tex. (1).

Cercospora eustomae Pk., leaf spot. Nebr. (1); Colo., Tex. (2). *C. nepheloides* Ell. & Holw. — Calif. (2); Tex. (1,2).

Fusarium solani (Mart.) Appel & Wr., root rot. Tex. (1).

Phyllosticta sp., leaf spot. Tex. (1).

Sclerophoma eustomonis Taub. & Ezekiel, stem blight. Tex. (1).

Exacum

E. affine Balf.

Biennial herb of Socotra (Africa), grown under glass for ornament.

Botrytis cinerea Pers. ex Fr., stem canker, blight. Kans.

Frasera, columbo

(1) *F. speciosa* Dougl. ex Hook
(2) Other species.

Tall biennial or perennial herbs, mostly in the Far Western States; sometimes grown in wild gardens.

Asteroma fraserae Ell. & Ev., black mildew. Colo., Idaho (1).
Cercospora fraserae Ell. & Ev., leaf spot. Colo. (1), Utah (2).
Diplodina fraserae (Ell. & Ev.) Tracy & Earle, on stems. Colo. (1,2).
Marssonina fraserae (Ell. & Ev.) Magn., leaf spot. Idaho, Wash. (2).
Phyllosticta fraserae Ell. & Ev., leaf spot. Colo. (2).
Uromyces speciosus Holw. (II, III), rust. Colo. (1,2); N. Mex. (1). O and I unknown.

Gentiana, gentian

(1) *G. andrewsii* Griseb., closed gentian.
(2) *G. crinita* Froel., fringed gentian.
(3) *G. linearis* Froel., narrow-leaved gentian.
(4) Other species.

Mostly perennial but a few annual herbs widely distributed, many in the West; most species have showy flowers, occasionally but not widely cultivated in rock gardens.

Asteromella andrewsii Petr., leaf spot. Ill., Iowa, Nebr., N.J., Pa., W. Va., Wis. (1); Del. (2); Iowa, Wis. (4). Reported as *Depazea gentianaecola* DC. ex Fr., also *Leptothyrium gentianaecola* (DC.) Baeumler and *Phyllosticta gentianaecola*, believed to be the conidial stage of *Mycosphaerella andrewsii*.
?Botrytis cinerea Pers. ex Fr., stem canker, blight. N.Y. (1). SEE ALSO *Sclerotium*.
Cercospora gentianae Pk., leaf spot. N.Dak. (1); N.Y., Vt. (3). *C. gentianicola* Ell. & Ev. — Del. (2), Wis. (4).
Fusarium solani (Mart.) Appel & Wr., root rot. Md. (2).
Mycosphaerella andrewsii (Sacc.) J.J.Davis, leaf spot. N.Dak., Wis. (1); ?Del. (4).
M. gentianae (Niessl) Lindau, on stems and leaves. Colo. (4).
Phyllosticta gentianicola (*gentianaecola*) (DC. ex Fr.) Ell. & Ev. SEE *Asteromella andrewsii*.
Puccinia gentianae (Strauss) Lk. (O,I,II,III), rust. N.Y. to Ind., Nebr., and Minn. (1); N.Y. (3); Eastern States to Calif. and Wash., also Alaska (4).
P. haleniae Arth. & Holw. (III), rust. Wyo. (4).
Pucciniastrum alaskanum Mains (II), rust. Alaska (4).
Sclerotium sp., stem rot. N.Y. (1). Perhaps *Botrytis cinerea*.
Septoria gentianoides Dearn. & House, on leaves. N.Y. (4). *S. tosevi* Bub. — Colo. (4).
Uromyces gentianae Arth. (II,III), rust. Colo., Iowa, N.C., Nev., N.Mex., Vt., Wash., Wyo. (4). O and I unknown.

Menyanthes

M. trifoliata L., bogbean.

Perennial herb of bogs in the Northeastern States to California and Alaska; useful to wildlife.

Ascochyta menyanthis Oud., leaf spot. N.Y.
Botrytis sp., gray-mold blight. N.Y.
Physoderma menyanthis d By., leaf gall. Mich., N.Y., Wash., Wyo., Alaska.
Septoria menyanthis Desm., leaf spot. Wis.

Nymphoides

Nymphoides spp., floatingheart.

Perennial aquatic herbs occurring in ponds in the Eastern and Central States and southward; useful to wildlife.

Burrillia decipiens (Wint.) Clint., leaf smut. N.J.
Puccinia scirpi DC. (O,I), rust. Fla. II and III on *Scirpus* spp.

Sabatia

Sabatia (*Sabbatia*) spp., rosegentian.

Annual or biennial herbs of prairies and marshes in the Eastern and Central States; sometimes grown in wild gardens.

Cercospora sabbatiae Ell. & Ev., leaf spot. Del., Miss., N.C., Okla., Tex.
Gloeosporium sp., anthracnose. Okla.

GERANIACEAE

Erodium, heronbill

(1) *E. cicutarium* (L.) L'Her., alfileria.
(2) *E. moschatum* L'Her
(3) *E. texanum* A.Gray

Annual or biennial herbs: (1,2) naturalized from Europe or (3) native; (1) is a widely distributed weed in cultivated ground; useful to wildlife.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. (1).
Pseudomonas erodii I.M.Lewis, bacterial spot. Tex. (3).
Pseudoperonospora erodii (Fckl.) G.W.Wils., downy mildew. Mont. (1), Tex. (3).
Rhizoctonia solani Kuehn, root rot. Tex. (1,3).
Sclerotium rolfsii Sacc., southern blight. Tex. (1,3).
Synchytrium papillatum Farl., leaf gall. Ariz., Calif., Oreg. (1); Calif. (2); Tex. (1,3).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1,2).
YELLOWS—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (1,2).

Geranium, cranesbill

(1) *G. carolinianum* L., Carolina geranium, cranesbill.
(2) *G. maculatum* L., spotted geranium.
(3) *G. robertianum* L., herb Robert, red-robin.
(4) *G. sanguineum* L., blood-red geranium.
(5) Other species.

Annual (1,3) or perennial (2,4) herbs, mostly in woodlands or waste ground: (1), (2), and (3) widely distributed in the United States; (2,3) are sometimes grown in wild gardens, and various European and Asiatic species (4,5) may be cultivated for ornament.

Botrytis cinerea Pers. ex Fr., leaf spot, stem rot. Kans., Mo., Alaska (5).

Cercospora geranii Kell. & Swing., leaf spot. Kans. (1); Iowa, Mo., N.Y., Tex., Wis. (2); Colo., Kans., Mont., Tex., Utah, Wyo. (5).

Cylindrosporium geranii Ell. & Ev., leaf spot. La. (1).

Diaporthe eres Nits., on stems. Calif. (5).

Dilophospora geranii Schroet., leaf spot. Wis. (2).

Erysiphe polygoni DC., powdery mildew. Ill., Ind., Ohio, Pa., W. Va., Wis. (2); Colo., Wyo. (5).

Pestaloziella subsessilis Sacc. & Ell., leaf spot. Miss., Mo., N.J. (1); Wis. (2).

Phyllosticta geranii Ell. & Ev., leaf spot. La., Tex. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).

Physalospora geranii Cke. & Harkn., on stems. Calif. (5).

Plasmopara geranii (Farl.) Berl. & DeT., downy mildew. N.J. to Fla., Tex., and Kans. (1); Mass. to Md., Iowa, and Wis. (2); this range and west to Tex., Utah, and Mont. (5).

Pseudomonas erodii Lewis, bacterial spot. Fla. (3); Ill., Ind., Oreg., Tex. (4).

Puccinia leveillei Mont. (III), rust. Colo., Mont., Utah, Wash., Wyo., Alaska, T.H. (5).

P. polygoni-amphibii Pers. (O,I)—Kans., Tex. (1); Conn. to Miss., Mo., and Minn. (2); Conn., Mont. (5). II and III on *Polygonum* spp. Also reported as var. *persicaria* (Strauss) Arth.

Ramularia geranii (West.) Fckl., leaf spot. La. (1); Wash., Wyo. (5). SEE ALSO *Venturia glomerata*.

Seaverinia (*Sclerotinia*) *geranii* (Seaver & Horne) Whet., rhizome rot. N.Y., Wis. (2).

Septoria expansa Niessl, leaf spot. Kans., Tex. (1).

Sphaerotheca humuli (DC.) Burr., powery mildew. Calif., Mont., Utah, Wash., Wyo. (4). Also var. *fuliginea* (Schlecht.) Salm. — Minn., Nebr., Pa., Wis. (2); Idaho, Mont., Wash. (4).

?Stigmatea geranii Fr., black leaf speck. Md. (1). *S. robertiani* Fr. — Mass., N.Y., Vt., W. Va. (4).

Synchytrium geranii Clendenin, leaf gall. La. (1,5); Okla., Tex. (1).

Uromyces geranii (DC.) Fr. (O,I,II,III), rust. Maine, Wyo., Alaska (5).

Venturia circinans (Fr.) Sacc., leaf spot, mold. Alaska (5).

V. glomerata Cke.—Calif. (1). Said to be the asciger-ous stage of *Ramularia geranii*.

Xanthomonas geranii (Burkh.) Dows., bacterial leaf spot. N.Y. (4,5; and experimentally 2).

MOSAIC — virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M. Sm.). Fla. (1).

Pelargonium, storksbill, geranium (of florists)

Pelargonium spp.

Perennial herbs or shrubs, mostly of Africa, widely cultivated as house plants, and in the open in warm regions. The numerous horticultural forms are usually not discriminated in reports, but the following species or varieties are sometimes distinguished: (1) *P. domesticum* Bailey, Lady Washington geranium; (2) *P. graveolens* L'Her., rose geranium; (3) *P. hortorum* Bailey (× P. *zonale* Willd.), fish geranium; (4) *P. peltatum* Ait., ivy geranium.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Mass., Md., Ohio. Widely used as experimental host.

Alternaria sp. (?*A. tenuis* Nees ex Cda.), secondary leaf spot. Cosmopolitan.

Aphelenchoides sp., leaf nematode. N.Y.

Ascochyta sp., leaf spot. Conn., N.J.

Aspergillus fischeri Wehmer, stem rot. Calif.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on stems. Ala.

Botryosporium pulchrum Cda., leaf mold. Occasional in greenhouses.

Botrytis cinerea Pers. ex Fr., gray-mold leaf spot, blossom blight, cutting rot. Cosmopolitan.

Cercospora brunkii Ell. & Gall., leaf spot. Mostly in the South (Fla. to Tex.) occasionally north, Md., Ohio, N.H.; commonly on (4), sometimes (2,3).

Corynebacterium fascians (Tilford) Dows., fasciation. Mass., Ohio.

Diaporthe meduseae Nits., on stems. Calif.

Discohainesia oenotherae (Cke. & Ell.) Nannf., on leaves. Md. (2), N.J. (3).

Fusarium sp. (?*F. merismoides* Cda.), stem rot, wilt (? secondary). Ind., N.Y., Wash.

Gloeosporium pelargonii Cke. & Mass., on leaves. P.R. (2).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Conn., Fla., N.J., Ohio, Oreg.

Pleosphaerulina sp., leaf spot. Pa.

Pseudomonas erodii Lewis, bacterial leaf spot. Ala., Fla., Miss., Mo., Tex.; occasionally north, Conn. to Ill., Oreg., Wash. (*). Probably confused in part with *Xanthomonas pelargonii*.

Pythium spp., blackleg, stem rot, cutting rot. Cosmopolitan. *P. debaryanum* Hesse identified in Md.; *P. mamillatum* Meurs—N.Y.; *P. splendens* Braun —Md.; *P. ultimum* Trow—N.J., N.Y.; *P. vexans* d By.—Md., Okla., Pa., T.H. Reported on (1,2,3).

Rhizoctonia solani Kuehn, stem rot of cuttings and sometimes of mature plants. Cosmopolitan.

Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Conn.

Verticillium albo-atrum Reinke & Berth., wilt. Calif. (1,3), N.Y.

Xanthomonas pelargonii (N.A. Brown) Starr & Burkh., bacterial leaf spot. Mass. to Va., Miss., and Ohio; also Calif., Wash. On (3), (4), and probably other types.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1,3).

LEAF CURL, CRINKLE — virus (*Marmor pelargonii* Holmes, Pelargonium virus 1 K.M.Sm.) Minn., N.J., Ohio, Pa., Wash.; probably general (3).

MOSAIC—virus (in part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.; in part unidentified). Fla., Ind., Minn., N.J., N.Y., Pa., Wash.

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Tex. (1,2).

INTUMESCENCE, OEDEMA (dropsy)—physiological, attributed to excessive soil moisture and retarded transpiration. Frequent in greenhouse culture; in the open, similar symptoms may result from leaf-curl virus.

GESNERIACEAE

Saintpaulia

S. ionantha Wendl., African-violet.

Perennial herb of tropical Africa, widely grown for ornament as an indoor pot plant.

Aphelenchoides sp., leaf nematode. Calif., ?N.Y.
Botrytis cinerea Pers. ex Fr., gray-mold blight, leaf rot. Reported in Mich. and N.Y., doubtless cosmopolitan.
Cylindrocarpon radicicola Wr., root rot (?secondary). Md., N.Y.
Fusarium solani (Mart.) Appel & Wr., root rot (?secondary). Md., N.Y.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Reported in Md. and N.Y., probably general in greenhouses.
Oidium sp., powdery mildew, on leaves and flowers. Md., N.J., N.Y.
Phytophthora sp., crown rot, wilt. Md., N.C.
Pratylenchus sp., root nematode. Md.
Pythium ultimum Trow, root and crown rot. Calif.
Rhizoctonia solani Kuehn, root rot. Md., N.Y.
Ring spot—physiological, attributed to wetting foliage with cold water. General.

Sinningia

S. speciosa Benth. & Hook., gloxinia.

Tuberous-rooted herb of Brazil, grown as a pot plant under glass for ornament; commercial production chiefly in California.

Botrytis cinerea Pers. ex Fr., bud rot. Calif., Mo.
Cladosporium ?herbarum Pers. ex Lk., leaf rot. N.J.
Phytophthora cryptogea Pethyb. & Laf., root and crown rot. Calif., ?N.Y.
Pythium ultimum Trow, root rot. Calif.
Sclerotinia sclerotiorum (Lib.) d By., crown rot. Calif.
Spotted wilt—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Mo., Tex.
Yellows—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Calif.
Boron deficiency—seedling dieback and wilt. Calif.

GINKGOACEAE

Ginkgo

G. biloba L., ginkgo, maidenhair-tree.

Deciduous tree of eastern China; cultivated, zone 4, for shade and ornament.

Fomes connatus (Weinm. ex Fr.) Gill. (*F. meliae* (Underw.) Murr., *Oxyporus populinus* (Schum. ex Fr.) Donk), sapwood or wound rot. Md.
Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf spot, anthracnose. Md., Tex.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Miss.
Phyllosticta gingko Brun., leaf spot. Ind., Md., Ohio, Pa., Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Polyporus spp., sapwood rot, sometimes on living trees following injuries: *P. albellus* Pk., *P. hirsutus* Wulf. ex Fr., *P. tulipiferus* (Schw.) Overh., *P. versicolor* L. ex Fr.—Md.
Xylaria longeana Rehm, seed rot. Pa.

GNETACEAE

Ephedra, jointfir

(1) *E. nevadensis* S. Wats., Nevada jointfir.
(2) *E. viridis* Coville, Mormon-tea.
(3) Other species.

Scale-leaved shrubs of arid plains in the West and Southwest; useful at times as browse for livestock and wildlife, also in soil-erosion control. Some of the American species are used medicinally or in the preparation of beverages by the Indians, but the drug ephedrine is obtained chiefly from the Chinese plant, *E. sinica* Stapf, introduced for testing as a drug plant in the United States.

Peridermium ephedrae Cke. (O, I), rust gall. Tex. to Calif. and Utah (*).
Phymatotrichum omnivorum (Shear) Dug., root rot. On *E. sinica*—Tex.
Schizostoma nevadensis Ell. & Ev., on dead stems. Colo. (1).
Teichospora megastega Ell. & Ev., on dead stems. Nev. (1), Utah (2).

GRAMINEAE [5]

Aegilops, goatgrass

(1) *A. cylindrica* Host, jointed goatgrass.
(2) Other species.

Annual grasses of Europe, locally naturalized in fields and waste ground; (1) a troublesome weed, especially to livestock on ranges in the Far West.

Cercosporella herpotrichoides Fron, foot rot. Oreg. (1,2).
Erysiphe graminis DC., powdery mildew. ?Ky.
Fusarium sp., head mold. Mich. (2). *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., pink mold, secondary root rot. Wash. (1).
Puccinia glumarum (Schm.) Eriks. & E. Henn. (II, III), stripe rust. Wash. (1). O and I unknown.
P. graminis Pers. (II,III), stem rust. Kans., Mich., Minn. The f. sp. *tritici* Eriks. & E. Henn. identified in Kans. O and I on *Berberis* spp.
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Kans., Mich., Oreg., Wash. (1,2). The var. *tritici* (Eriks. & E. Henn.) Carl. identified in Kans. O and I on *Thalictrum* spp. in cultures.
Pythium arrhenomanes Drechs., root browning. N. Dak. (1).
P. debaryanum Hesse—Wash. (1).

[5] Roderick Sprague's "Diseases of Cereals and Grasses in North America (Fungi, except Smuts and Rusts)" (published by the Ronald Press Company, New York) should be consulted for additional information.

Agropyron, wheatgrass

I. Native Species

(1) *Agropyron dasystachyum* (Hook.) Scribn., thickspike wheatgrass. Range Mich. to Ariz. and Wash.

(2) *A. inerme* (Scribn. & Smith) Rydb., beardless wheatgrass. Range Pacific Northwest to Nev. and Nebr.

(3) *A. smithii* Rydb., western (bluestem) wheatgrass. Range throughout the Central and Western States.

(4) *A. spicatum* (Pursh) Scribn. & Smith, bluebunch wheatgrass. Range S. Dak. to N. Mex. and westward.

(5) *A. subsecundum* (Link) Hitchc. (*A. caninum* of American authors, not (L.) Beauv.), bearded wheatgrass. Range throughout the Western, North Central, and Northeastern States.

(6) *A. trachycaulum* (Link) Malte (*A. pauciflorum* (Schwein.) Hitchc., *A. tenerum* Vasey), slender wheatgrass. Range same as (5).

(7) Other species.

Perennial grasses furnishing valuable forage in the Western States, especially 2,3,4,5, and 6; (6) also grown for hay and pasture in the Central States and the East.

Anguina sp., nematode gall. ?Wis. (6).

Ascochyta agropyrina (Fairm.) Trott., leaf spot. Mont. (3), N. Dak. (2,3,5,6,7), Utah (6), N. Mex. (7).

Ascospora graminis Lind, on leaves. Oreg. (1).

Cercosporella herpotrichoides Fron., foot rot. Idaho, Oreg., Wash. (1,2,7).

Cladosporium graminum Pers. ex Lk., leaf spot (?secondary). N. Dak., S. Dak. (3). See note under *Avena*.

Claviceps purpurea (Fr.) Tul., ergot. General (3,5,6), and probably others; noted on (1,2, and 4) only in the Northern Great Plains and Pacific Northwest.

Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Okla. (3); Minn., N. Dak., Oreg. (6).

Corynebacterium agropyri (O'Gara) Burkh., bacterial spot. Mont., Utah (3); Colo. (6).

Curvularia geniculata (Tracy & Earle) Boed., secondary root rot. N. Dak. (7).

Dilophospora alopecuri Fr., twist. Wash. (2,4); Idaho, Utah (3); Mont. (4); N. Dak., Wyo. (6).

Ellisiella caudata (Pk.) Sacc., on culms. Okla. (6).

Epichloë typhina (Pers. ex Fr.) Tul., choke, cat-tail. Ariz., N. Dak., S. Dak. (3); Wash. (4); Mont., N. Dak., Wash. (6).

Erysiphe graminis DC., powdery mildew. Probably general, but noted especially in the Northern Great Plains and Pacific Northwest (*), and the North Central States (6).

Fusarium spp. (a) Head mold, scab: *F. culmorum* (W. G. Sm.) Sacc.—Minn. (3). (b) Root and culm rot, often secondary: *F. culmorum* (W. G. Sm.) Sacc.—Wash. (6); *F. equiseti* (Cda.) Sacc.—N. Dak., S. Dak. (3,6); *F. graminearum* Schwabe—N. Dak. (5); *F. moniliforme* Sheldon—Nebr. (3); *F. oxysporum* Schlecht.—N. Dak. (1,3,6); *F. scirpi* Lambotte & Fautr. and especially the var. *acuminatum* (Ell. & Ev.) Wr.—Mont., N. Dak., S. Dak., Wyo (1,3,5,6); Minn., Nebr. (3); Wash. (5); *F. sporotrichioides* Sherb.—S. Dak. (3); Mont., N. Dak., S. Dak., Wyo. (6).

F. nivale (Fr.) Ces., snow mold. Wash. (3).

Helminthosporium sp., leaf spot. Mich. (2,4), Minn. (5,6).

H. sativum Pam., King, & Bakke, root rot. Minn., Mont., Nebr., N. Dak., S. Dak., Wyo. (*).

H. tritici-repentis Died., leaf blotch. Minn., Mont., N.Y., N. Dak., S. Dak., Wyo. (3); N. Dak. (5).

Hendersonia crastophila Sacc., leaf mold. N. Dak. (3).

Leptosphaeria culmifraga (Fr.) Ces. & de N., on dead culms. Calif. (5); N. Dak. (5,6).

Nigrospora sphaerica (Sacc.) Mason, black mold of culms. Colo. (6).

Ovularia pulchella (Ces.) Sacc., leaf spot. Wis. (6).

Phoma sp. (?P. *lophiostomoides* Sacc.), on culms. N. Dak., Utah (3).

Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Nebr. (3), N.Y. (3,6).

Physalospora festucae (Lib.) Sacc., on dead leaves. N. Dak. (6).

Pseudomonas coronafaciens (Elliott) F. L. Stevens var. *atropurpurea* (Reddy & Godkin) Stapp, chocolate spot. Mont., N. Dak., Nebr., S. Dak., Wash., Wyo.

Puccinia coronata Cda. (II,III), crown rust. ?Wash. (6).

P. glumarum (Schm.) Eriks. & E. Henn. (II,III), stripe rust. Mont. to Colo., Oreg., and Wash. (*).

P. graminis Pers. (II,III), stem rust. General (*). The f. sp. *secalis* Eriks. & E. Henn. has been confirmed on (3,5,6); the f. sp. *tritici* Eriks. & E. Henn. on (1,2,3,5,6).

P. montanensis Ell. (II,III), brown-stripe rust. Iowa to Colo., Wash., and N.Dak. (*); also to Mich. (2,5,6) and N.Mex. (6). O and I on *Berberis fendleri*.

P. pattersoniana Arth. (II,III), Patterson's rust. Oreg., Wash. (2); Idaho, Mont., Oreg., Utah, Wash. (4). O and I on *Brodiaea douglasii*.

P. rubigo-vera (DC.) Wint. (II,III), leaf rust. General (*). Numerous races have been distinguished, constituting according to Arthur the var. *agropyri* (Eriks.) Arth. and var. *agropyrina* (Eriks.) Arth. with O and I on Ranunculaceae, and var. *apocrypta* (Ell. & Tracy) Arth. with O and I on Hydrophyllaceae; according to Mains the f. sp. *montanensis*, *canadensis*, *dakotensis*, and *delphinii* (O and I on Ranunculaceae), *onosmodii* (O and I on Boraginaceae and Hydrophyllaceae), *hydrophylli* (O and I on *Hydrophyllum*), and *singularis* (O and I on Balsaminaceae).

Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, pink root. Minn., N.Dak. (5,6).

Pythium arrhenomanes Drechs., root browning, seedling blight. N. Dak., S. Dak. (*). *P. aristosporum* Vanterpool—N.Dak. (6).

P. debaryanum Hesse—N. Dak., S. Dak., Wyo. (1,3, 6,7); Wash. (6). *P. ultimum* Trow—N. Dak. (3).

Rhizoctonia solani Kuehn, secondary root rot. Occasional in Northern Great Plains (3,6).

Rhynchosporium secalis (Oud.) J.J.Davis, leaf scald. Oreg. (1), Idaho (5), Wash. (6).

Scolecotrichum graminis Fckl., brown stripe. General (*), noted especially in the Pacific Northwest and northern Great Plains.

Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A.G. Johnson, stem speckle. General in the Pacific Northwest and northern Great Plains (*); Ariz. (3). *S. obtusa* Sprague & A.G. Johnson—Wash. (2).

Septogloeum oxysporum Sacc., Bomm. & Rouss., char spot. Wyo. (4); Mont., N. Dak., S. Dak. (6).

Septoria agropyrina Lobik, leaf spot. Mont., N.Dak., Nebr. (3,6).

S. elymi Ell. & Ev. (*S. agropyri* Ell. & Ev.), speckled leaf blotch. Oreg., Wash. (2); Minn. and Iowa to

Mont. (3); Oreg., Wash., Wyo. (4); Mont., N. Dak. (5); Iowa, Minn., Mont., N.Dak. (6).

Septoria infuscans (Ell. & Ev.) Sprague, brown leaf blotch. Oreg., Wash. (4).

Stagonospora arenaria Sacc., purple-brown blotch. N. Dak., S. Dak. (3,6,7); Mich. (3,6).

Tilletia caries (DC.) Tul., rough-spored bunt. Idaho (5,6), Wash. (2,4,5,6).

T. earlei Griff. (*Ustilago earlei* (Griff.) Cif.), stem smut. S.Dak (3).

?Typhula itoana Imai, snow mold, leaf rot. Wis. (5).

Urocystis agropyri (Preuss) Schroet., flag smut. Ariz., N.Mex., N.Dak., S. Dak., Utah (3); Oreg., Utah, Wash. (4); Utah, Wyo. (6).

Ustilago bullata Berk., head smut. Mont. to Utah, Oreg., and Wash. (1,2,4,5,6); Mich. (6.)

U. spegazzinii Hirsch. (*U. hypodytes* of American authors) also var. *agrestis* (Syd.) G.W.Fisch. & Hirsch., stem smut. Wash. (1,2,3,4,6,7); Colo., Mont., N. Dak., Oreg., S. Dak. (3); Ariz., Colo. (6). The species and the variety are reported as not having identical host and geographic ranges; this record being a composite of reports under the older but questionable name used by American authors.

U. striiformis (West.) Niessl, stripe smut. Utah, Oreg., Wash. (2,4); Wash. (5); Ariz., Colo., Mont., Oreg., S.Dak., Utah, Wash. (6). *U. macrospora* Desm., reported on (2) in Wash., on (4) in Oreg., on (6) in Utah, is included; and also *U. aculeata* (Ule) Liro—Wash. (2,3); Oreg. (3).

Wojnowicia graminis (McAlp.) Sacc. & D.Sacc., secondary root rot. Kans., Mont., N.Dak., Wash. (2,3,5,7).

Xanthomonas translucens (L.R.Jones, A.G.Johnson, & Reddy) Dows., bacterial blight. N.Dak. (1,3); Wash. (5).

BENDS (deformity of apical part of culm)—cause unknown. Wash. (1,2,4,5).

II. Introduced Species, Cultivated or Naturalized

(1) *Agropyron cristatum* (L.) Gaertn., crested wheatgrass.
(2) *A. desertorum* (Fisch.) Schult.
(3) *A. repens* L., quackgrass.
(4) *A. sibiricum* (Willd.) Beauv., Siberian wheatgrass.
(5) Other species.

Perennial grasses of Europe and Asia: (1) extensively grown for forage and hay in the Northern Great Plains; (2) and (4) introduced for similar use; (3) a cosmopolitan weed in the Northern States.

Alternaria tenuis Nees ex Cda., seed mold. In commercial seed lots (1).

Ascochyta agropyrina (Fairm.) Trott., leaf spot. Mont., N.Dak., Wash. (1); Mich. (4). *A. graminicola* Sacc.—Mass. (3).

Brachycladium spiciferum Bainier, ?secondary root rot. S.Dak. (1).

Cercosporella herpotrichoides Fron, foot rot. Wash. (1).

Cladosporium graminum Pers. ex Lk., leaf mold. Iowa (3).

Claviceps purpurea (Fr.) Tul., ergot. General (1,3,4); Mich. (5).

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Minn. (2,3); N.Dak., Pa., Tex. (3).

Corynebacterium agropyri (O'Gara) Burkh., bacterial spot. N.Dak. (1).

Curvularia geniculata (Tracy & Earle) Boed., secondary root rot. N. Dak., S. Dak. (1,3,4).

Cuscuta gronovii Willd., dodder. N.Y. (3).

Didymella agrostidis Dearn. & House, on culms. N.Y. (3).

Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (3).

Epicoccum purpurascens Ehr., head mold. Oreg. (1).

Erysiphe graminis DC., powdery mildew. General (*). As far as known the mildew on *Agropyron* is a special race or races distinct at least from those on the common cereals.

Fusarium spp., root and stem rot (often secondary), pink mold: *F. culmorum* (W.G. Sm.) Sacc.—Oreg., Wash. (1); *F. equiseti* (Cda.) Sacc.—Nebr. (1); N. Dak., S. Dak. (1,3); *F. oxysporum* Schlecht.—Oreg., N. Dak., S. Dak. (1); *F. graminearum* Schwabe—N. Dak (1); *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr.—Northern Great Plains to Oreg. and Wash. (1); Minn., N. Dak., S. Dak. (3); N. Dak., Nebr. (4,5).

Gloeosporium bolleyi Sprague, seedling root rot. N. Dak., S. Dak. (1).

Helminthosporium giganteum Heald & Wolf, zonate eyespot. Md., Tex., Va. (3).

H. sativum Pam., King, & Bakke, root rot, seed rot, seedling blight. Wis. to Nebr. and Wash. (1,3), N.Y. (3), N. Dak. (4,5).

H. tritici-repentis Died., leaf blotch. S. Dak. (1); N.Y. to Ky. and S. Dak., also Oreg. and Wash. (3).

Marasmius sp. (*M. tritici* P. A. Young), on culms, ?collar rot. Ill., Minn., Wis. (3).

Mycosphaerella tassiana (de N.) Johans., on culms. Oreg. (1).

Ophiobolus herpotrichus (Fr.) Sacc., on culms. Md., N.Y., Va., Wis. (3).

O. graminis Sacc., take-all. N.Y. (3).

Ovularia pulchella (Ces.) Sacc., leaf spot. Wis. (3).

O. pusilla (Ung.) Sacc. & D. Sacc—Colo. (1).

Papularia sphaerosperma (Pers. ex Lk.) Hoehn., also var. *inquinans* (Dur. & Mont.) Grove (*Coniosporium rhizophilum* (Preuss) Sacc.), on stolons and culms. N.Y. (3).

Phleospora graminearum Sprague & Hardison, leaf spot. Mich. (3).

Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Mich. (1); Maine to W. Va., Iowa., and Minn (3).

Physoderma ?graminis (Büsgen) A. Fisch., brown streak. Ill., Ind., Mich., Wis. (3).

Phytophthora sp., leaf rot. N. Dak. (4).

Pseudomonas coronafaciens (Elliott) F. L. Stevens var. *atropurpurea* (Reddy & Godkin) Stapp, chocolate spot. Wyo. (1), N.Y. to Nebr. and N. Dak (3), N. Dak. (5).

Puccinia coronata Cda. (II,III), crown rust. Mass., N. H., Vt. (3); Mich. (4).

P. glumarum (Schm.) Eriks. & E. Henn. (II,III), stripe rust. Calif., Idaho, Oreg. (1); Idaho, Mont. (3); Wash. (*).

P. graminis Pers. (II,III), stem rust. N. Dak. (1,2,4); general (3); Mich., N. Dak. (4). The f. spp. *secalis* Eriks. & E. Henn. and *tritici* Eriks. & E. Henn. have been confirmed, the former predominant in natural infections.

P. montanensis Ell. (II,III), brown stripe rust. N. Dak. (1,4,5); Mont., N. Dak., S. Dak. (3).

P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Mich., N. Dak. (1,2,4); general (3); Mich., N. Dak. (4). The common leaf rust on (3) is designated var. *agropyrina* (Eriks.) Arth. or f. sp. *persistens* (Plowr.) Mains.

Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, pink root, N. Dak. (1,3).

Pythium arrhenomanes Drechs., root browning, seedling blight. N. Dak., S. Dak. (*); Minn. (3); *P. aristosporum* Vanterpool—Mont. (1); *P. debaryanum* Hesse, root necrosis, seed rot. Minn. (3); N. Dak. (*); *P. graminicola* Subr. (*?P. arrhenomanes* Drechs.), root browning, seedling blight.

Minn., S. Dak. (1); *P. ultimum* Trow, root necrosis, seed rot. Minn. (3), N. Dak. (*).
Rhizoctonia solani Kuehn, secondary root rot. N. Dak., S. Dak., Wash. (1); Minn., N. Dak. (3,4).
Rhynchosporium secalis (Oud.) J.J. Davis, leaf scald. Calif., Minn., N. Dak., Oreg., Wash., Wis. (3); Wash. (5). A specialized race is distinguished on *Agropyron.*
Scolecotrichum graminis Fckl., leaf streak. N. Dak. (1); N. Dak., S. Dak., Wash. (3).
Selenophoma donacis (Pass.) Sprague & A. G. Johnson var. *stomaticola* (Baeumler) Sprague & A. G. Johnson, stem speckle. Wyo. (1); N. Dak., Wash. (3).
Septogloeum oxysporum Sacc., Bomm. & Rouss., char spot. N. Dak. (3).
Septoria agropyrina Lobik, leaf spot. S. Dak. (3); N. Dak. (5).
S. avenae Frank f. sp. *triticea* T. Johnson — N. Dak. (1).
S. elymi Ell. & Ev., speckled leaf blotch. Ill. to Minn., Oreg., and Wash. (3).
?S. nodorum Berk., leaf spot. Ky., N. Dak. (3). SEE ALSO *Stagonospora.*
Stagonospora arenaria Sacc., leaf blotch. Oreg. (3).
Stemphylium botryosum Wallr., leaf mold. S. Dak. (1).
Tilletia caries (DC.) Tul. and *T. foetida* (Wallr.) Liro, bunt. Wash. (1).
T. earlei Griff., stem smut. N. Dak. (3). Also reported as *Ustilago earlei* (Griff.) Cif.
Typhula idahoensis Remsberg, snow mold. Idaho (1).
Urocystis agropyri (Preuss) Schroet., flag smut. Mass. to Mo. and Wis. (3).
Ustilago bullata Berk., head smut. Wash. (1), Nebr. (5).
U. hordei (Pers.) Lagh., covered kernel smut. Mont., N. Dak., Wash. (1).
U. spegazzinii Hirsch. (*U. hypodytes* of Amer. auths.), also var. *agrestis* (Syd.) G. W. Fisch. & Hirsch., stem smut. Oreg., Wash. (1); Idaho, Mich., N.Y., N. Dak., Oreg., S. Dak., Wash. (3); Wash. (4,5).
U. striiformis (West.) Niessl, stripe smut. N.Y., Pa., Tex., Wis. (3); Wash. (5). Includes *U. macrospora* Desm. as reported on (3) in Iowa, Mass., Minn., and Wis. The f. sp. *hordei* G. W. Fisch. has been distinguished on *Agropyron* in the Pacific Northwest. *U. aculeata* (Ule) Liro, closely related, is also reported in Wash. (1).
U. nuda (Jens.) Rostr., loose kernel smut. Wash. (4).
Wojnowicia graminis (McAlp.) Sacc. & D. Sacc., secondary root rot, leaf rot. N. Dak. (1,3); Oreg., Wash. (1).
Xanthomonas translucens L. R. Jones, A. G. Johnson, & Reddy, bacterial blight. Calif., N. Dak., Oreg., Wis. (3). Designated on this host as f. sp. *cerealis* Hagborg.
MOSAIC—virus (*Marmor agropyri* McK.). Va. A green var. (*typicum*) and a yellow one (*flavum*) have been distinguished.
BENDS (hairpin)—cause unknown. Mont. (1), Wash. (1,4,5).

Agrostis

I. *Agrostis alba* L., Redtop

Perennial grass of Europe and Asia, long cultivated for pasture and hay, and naturalized throughout the northern United States.

Ascochyta graminicola Sacc., on leaves. N. Y.
Claviceps microcephala (Wallr.) Tul., ergot. Mich., Ohio, Oreg. *C. purpurea* (Fr.) Tul.—Pa. to Iowa and N. Dak.; Oreg.
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. N. Y. to Md., Iowa, and Oreg.
Cylindrosporium glyceriae Ell. & Ev., leaf spot. N.Y.
Didymella agrostidis Dearn. & House, on culms. N.Y.
Entyloma crastophilum Sacc., leaf smut. Wis.
Erysiphe graminis DC., powdery mildew. Iowa, Minn.
Fusarium nivale (Fr.) Ces., snow mold. Oreg.
Helminthosporium erythrospilum Drechs., leaf spot. Mass. to Va., Ind., and Wis. Other species reported on necrotic portions of leaves: *H. dematioideum* Bub. & Wrób.—Conn., N.Y.; *H. stenacrum* Drechs. —Iowa, Md., N.C.; *H. triseptatum* Drechs.—Md., N. Y., Va.
Macrophoma sparticola Berl. & Vogl., on culms. Mich.
Marasmius tritici P. A. Young, on base of culms, ?collar rot. Ill.
Mastigosporium rubricosum (Dearn. & Barth.) Sprague, red eyespot. Oreg., Wyo.
Ophiobolus graminis Sacc., foot rot. N. Y.
Ovularia sp., leaf spot. Pa. *O. pulchella* (Ces.) Sacc. —Oreg., Utah.
Phaeoseptoria calamagrostidis Sprague, leaf mold. Oreg.
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Calif., N. Y., Va.
Placosphaeria graminis Sacc. & Roum., on leaves. Va.
Puccinia coronata Cda. (II,III), crown rust. Fla., Ga., Ky., La., Oreg.
P. glumarum (Schm.) Eriks. & E. Henn. (II,III), stripe rust. Mont.
P. graminis Pers. (II,III), black stem rust. Maine to Va. and west to the Pacific coast. All tested collections belong to the f. sp. *agrostis* Eriks.
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Mich., N. Y., Tenn., Va., Wis. Identified as var. *impatientis* (Arth.) Mains in N. Y.
Pythium debaryanum Hesse and *P. ultimum* Trow, damping-off, root necrosis. Conn., N. Dak.
Ramularia graminicola Pk., on leaves. Wis.
Rhizoctonia solani Kuehn, root rot, brown patch. General.
Ramulispora sorghi (Ell. & Ev.) L.S. Olive & Lefebvre, copper spot. N.J. and Pa.
Rhynchosporium orthosporum Caldwell, leaf scald. Oreg.
R. secalis (Oud.) J. J. Davis—Oreg.
Sclerotium sp., dollar spot (small brown patch). General in the Northeastern and Central States. A similar disease of turf grasses in England has been referred to *Sclerotinia homoeocarpa* F. T. Bennett, and isolates from American material have also been identified as this although none, so far as known, have been sporiferous. Whetzel suggested that Bennett's *S. homoeocarpa* is properly a *Rutstroemia* but did not publish this combination (*R. homocarpa* Karst. is a different fungus). There are important discrepancies in this allocation, however, and pending more definite information the American fungus is perhaps best referred to in its vegetative form under this heading.
S. rhizodes of authors, ?Auers., leaf rot, tip blight. Conn, Mass., Pa., Wis., Wyo. Confused in part with *Typhula itoana,* and considered by some authorities as only an atypical strain of *Rhizoctonia solani.*
Scolecotrichum graminis Fckl., brown stripe. N. Y. to Wis., Oreg., and Wash.
Septogloeum oxysporum Sacc., Bomm. & Rouss., char spot. Wyo.
Septoria triseti Speg., gray leaf speckle. Oreg.
Synchytrium sp., purple leaf speckle. Oreg., Wash.
Tylenchus spiralis Cassidy, root nematode. T.H.
Urocystis agropyri (Preuss) Schroet., flag smut. Wis.
Uromyces jacksonii Arth. & Fromme (II,III), rust. Oreg. O and I unknown.
Ustilago striiformis (West.) Niessl, stripe smut. Mass. to Va., Ill., and the Pacific Northwest. The f. sp. *agrostidis* W. H. Davis has been distinguished.

II. Bentgrass, Bent

(1) *Agrostis canina* L., velvet bentgrass.
(2) *A. palustris* Huds., creeping bentgrass. Includes several agronomic varieties, such as Metropolitan, Seaside, Washington bentgrass.
(3) *A. stolonifera* L.
(4) *A. tenuis* Sibth., Colonial bentgrass.
(5) Other species.

Perennial grasses of European origin, except (3) which is native to northern North America; long in cultivation for fine turf, especially (2) and (4); (4) also for pasture and extensively naturalized in the Northern States and the north Pacific coast, (2) also in the North Central States to Texas.

Anguina sp., nematode gall of seed. Oreg. (2,4).
Ascochyta graminicola Sacc., on leaves. Mass. (1).
Cladochytrium graminis Büsgen, associated with brown patch and damping-off, perhaps saprophytic. Conn. (2,3).
Claviceps microcephala (Wallr.) Tul. (=*C. purpurea* (Fr.) Tul.?), ergot. Oreg. (2,4).
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Wash. (3).
Curvularia lunata (Wakk.) Boed., leaf mold. Va. ?Pa. (2).
Ditylenchus graminophila (Goodey) Filip., nematode gall of leaves. Oreg. (4).
Entyloma crastophilum Sacc., leaf smut. Wis. (4).
Fusarium culmorum (W. G. Sm.) Sacc., root rot, snow mold. Oreg. (2,4). *F. nivale* (Fr.) Ces., snow mold. Reported in the Pacific Northwest. North Central, and Northeastern States, but this injury has been confused with that caused by *F. culmorum* in Oreg. and Wash., and by *Typhula itoana* in the East; on all listed host species, especially some strains of (2). *F. scirpi* Lambotte & Fautr. var. *acuminata* (Ell. & Ev.) Wr., secondary root rot. Oreg. (2).
Helminthosporium erythrospilum Drechs., leaf spot. Va. (2,3).
H. giganteum Heald & Wolf, zonate eyespot. Md. (1, 2); Conn., Mich., N.Y., Tex., Va. (2). Occurs chiefly on the Virginia strain of (2). "Melting-out disease," ascribed to *Helminthosporium* sp., was recently reported in Mich.
H. stenacrum Drechs., leaf mold. Conn. (3); Oreg. (4).
Macrophoma phlei Tehon & Stout, leaf mold. Oreg. (2).
Mastigosporium rubicosum (Dearn. & Barth.) Sprague, red eyespot. Oreg., Wash. (*, especially 2).
Ovularia pulchella (Ces.) Sacc., tan leaf spot. Oreg. (2), Utah (4).
Phaeoseptoria calamagrostidis Sprague, leaf mold. Oreg. (2).
Piricularia grisea (Cke.) Sacc., leaf blight. Tex. (3).
Puccinia coronata Cda. (II,III), crown rust. Oreg. (1, 2 4); Maine, Mass., N.H., Vt. (2,4); Calif., Wash. (5). Has been designated f. sp. *festucae* Eriks.
P. graminis Pers. (II,III), black stem rust. Oreg. (1); Calif. (2,3); Maine, Pa., Vt. (3); Mass. to Md., Iowa, and Oreg. (4). The f. sp. *agrostis* Eriks. has been identified on all listed species, and the f. sp. *tritici* Eriks. & E. Henn. on (1).
Pythium aphanidermatum (Edson) Fitzp., spot blight. General in North Central and Eastern States, occasional in Northeast (1,2,4).
P. butleri Subr., "grease spot." Ill., Ind.
Ramulispora sorghi (Ell. & Ev.) L. S. Olive & Lefebvre, copper spot. R.I. (1,3,4).
Rhizoctonia solani Kuehn, brown patch, root rot. General (*).
Robillardia agrostidis Sprague, leaf rot. Oreg. (4).
Sclerotium sp., dollar spot. General in Northeastern and Central States, occasional in Pacific Northwest; especially on (2), some strains of (4) are resistant. See note on this name under *Agrostis alba*.
Scolecotrichum graminis Fckl., brown stripe. Maine, Mass., N.H., Vt. (2,4); Ind. (4); Oreg. (5).
Septoria calamagrostidis (Lib.) Sacc., leaf spot. Oreg. (2).
S. triseti Speg., gray leaf speckle. Oreg., Wash. (4,5).
Synchytrium sp., purple leaf speckle. Oreg., Wash. (1, 2,4).
Tilletia pallida G. W. Fisch., head smut. N.J., Ohio, R.I. (1); Oreg. (2).
Typhula itoana Imai, snow scald. Minn., Mass., N.J., N.Y., Pa. (1,2,4).
Urocystis agropyri (Preuss) Schroet., flag smut. Vt. (2,4).
Uromyces jacksonii Arth. & Fromme (II,III), rust. Oreg. (2).
Ustilago striiformis (West.) Niessl, stripe smut. Mass. to Mo. and Iowa (2,4); Oreg., Wash. (2,3,4,5).
FAIRY RINGS, RING SPOT—Occasional on fairways and greens of golf courses, and on lawns and pastures composed primarily of *Agrostis* spp. and similar stoloniferous grasses; caused by subterranean mycelium of various fleshy fungi, commonly *Agaricus campestris* L. ex Fr., *Marasmius oreades* Fr., *Calvatia cyathiformis* (Bosc) Morg., *Lycoperdon* spp., and others.
SLIME MOLDS—Occasional to frequent on turf in humid regions; *Physarum cinereum* (Batsch) Pers. and *Fuligo septica* (L.) Weber commonly noted.

III. Native Range and Dune Grasses

(1) *Agrostis diegoensis* Vasey, thingrass. Montana to California and Washington.
(2) *A. exarata* Trin., spike bentgrass. Rocky Mountain and Pacific Coast States.
(3) *A. hiemalis* (Walt.) B.S.P., including *A. scabra* Willd., ticklegrass. Throughout temperate North America.
(4) *A. perennans* (Walt.) Tuckerm., autumn bent. Eastern and Central States to the Great Plains.
(5) Other species.

Perennial grasses useful for forage (1,2) or wildlife (3,4).

Anguina sp., nematode gall of seed. Oreg. (4).
Claviceps purpurea (Fr.) Tul., ergot. Oreg. (2); N. Dak., Okla., Wis. (3).
Endoconidium temulentum Prill. & Del. (=*Phialea temulenta* Prill. & Del.), blind seed disease. Oreg. (2).
Epichloë typhina (Pers. ex Fr.) Tul., choke. Va. (4).
Erysiphe graminis DC., powdery mildew. Calif. (1,2); Idaho, Mont., Oreg., Wash., Alaska (2).
Euryachora aristidae (Schw.) Th. & Syd., tar spot. Oreg. (5).
Helminthosporium dematioideum Bub. & Wrób., leaf mold. Conn., N.Y. (4). *H. erythospilum* Drechs., leaf spot. Conn., N.Y. (4). *H. triseptatum* Drechs. —Oreg. (2).
Hendersonia culmicola Sacc., leaf mold. Oreg. (2,5).
Mastigosporium rubricosum (Dearn. & Barth.) Sprague, red eyespot. Oreg. (2).
Mycosphaerella sp., on culms. Alaska (3).

Placosphaeria graminis Sacc. & Roum., tar spot. Wash. (5).
Puccinia coronata Cda. (II,III), crown rust. Oreg. (1,2); Calif., Wash. (2).
P. graminis Pers. (II,III), black stem rust. Calif. (1, 2,5); Idaho, Mont., Nebr., Oreg. (2); Maine to Mass., Iowa, and N. Dak. (3); Maine to Pa. (4). The f. sp. *agrostis* Eriks. has been identified on (1) and (3); f. sp. *avenae* Eriks. & E. Henn. on (2).
P. liatridis (Webber) Bethel (II,III), leaf rust. Colo. (2,3), N. Mex. (3). O and I on *Liatris* spp.
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Maine to Pa., Tex., and Wis. (3,4). The var. *impatientis* (Arth.) Mains has been identified.
Pythium debaryanum Hesse, root necrosis. N. Dak. (3,4).
Rhizoctonia solani Kuehn, leaf rot. Oreg. (5). Perhaps this also as *Sclerotium rhizodes* Auers., leaf-tip blight. Wis. (3).
Scolecotrichum graminis Fckl., brown stripe. Calif., Idaho, Oreg., S. Dak. (2,3,5).
Selenophoma donacis (Pass.) Sprague & A. G. Johnson var. *everhartii* (Sacc. & Syd.) Sprague & A. G. Johnson, stem speckle. Calif. (1), N. Dak. (3).
Septogloeum oxysporum Sacc., Bomm. & Rouss., char spot. Oreg. (3,5).
Septoria calamagrostidis (Lib.) Sacc., leaf spot. Oreg. (1,2), Alaska (2,3).
S. secalis Prill. & Del. var. *stipae* Sprague — N. Dak. (3), Oreg. (5).
S. triseti Speg., gray leaf speckle. Oreg. (2).
Synchytrium sp., purple leaf speckle. Oreg. (2,5).
Uromyces jacksonii Arth. & Fromme (II,III), rust. Calif. (1,5), Oreg. (2,5). O and I unknown.
Ustilago striiformis (West.) Niessl, stripe smut. Oreg., Utah (2); Pa., W. Va. (4).

Alopecurus, foxtail

(1) *A. aequalis* Sobol., shortawn foxtail. Range throughout the northern United States to New Mexico and California in the West.
(2) *A. geniculatus* L., water foxtail. Range as for (1).
(3) *A. pratensis* L., meadow foxtail. Native of Europe, naturalized in the Northern States.
(4) Other species.

Mostly perennial grasses of moist habitats: (1) of some forage value in upland ranges in the West, (2) sometimes cultivated as a meadow grass; useful to wildlife.

Claviceps purpurea (Fr.) Tul., ergot. N. Dak. (2); Ind., Mich., Mont., Oreg. (3).
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Mich., Minn., Mont., Oreg. (1,3).
Endoconidium temulentum Prill. & Del., blind seed disease. Oreg. (2).
Entyloma speciosum Schroet. & P. Henn., leaf smut. Tex. (2).
Epichloë typhina (Pers. ex Fr.) Tul., choke. Mich. (1).
Fusicladium fasciculatum Cke. & Ell., leaf mold. Mo. (2).
Helminthosporium sp., leaf spot. N. Dak. (3).
Puccinia coronata Cda. (II,III), crown rust. Ind. (1); La., Minn. (2); Oreg. (3).
P. graminis Pers. (II,III), black stem rust. Calif., Ind. (1); Minn., N. Dak., Wis. (1,2); Iowa, Minn., Oreg., S. Dak., Wash. (3); Ariz., Oreg. (4). The f. sp. *agrostis* Eriks. and f. sp. *avenae* Eriks. & E. Henn. have been confirmed on (1) and (3); also var. *phlei-pratensis* (Eriks. & E. Henn.) Stakman & Piemeisel has been identified.
P. poae-sudeticae (West.) Jørst. (II,III), leaf rust. Utah (1); Ind., Nebr. (1,2); Colo. (4). O and I unknown.
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Mass. (3). The var. *agropyrina* (Eriks.) Arth. noted.
Rhynchosporium orthosporum Caldwell, scald. Oreg. (3).
Sclerospora graminicola (Sacc.) Schroet., downy mildew. Miss. (3).
Scolecotrichum graminis Fckl., brown stripe. Maine to Miss., Tex., and Oreg. (*).
Uromyces alopecuri Seym. (II,III), leaf rust. Colo., Iowa, Minn., Nebr., Wyo. (1,2).

Ammophila, beachgrass

(1) *A. arenaria* (L.) Link, European beachgrass.
(2) *A. breviligulata* Fernald, American beachgrass.

Coarse perennial grasses of beaches and sand dunes, (1) introduced for erosion control; useful to wildlife.

Camarosporium graminicola Ell. & Ev., on culms. N.Y. (2). *C. metableticum* Trail—Mass. (2).
Claviceps purpurea (Fr.) Tul., ergot. Ind., Mich., Ohio (2).
Fusicladium fasciculatum Cke. & Ell., leaf mold. Calif. (1).
Helminthosporium sativum Pam., King, & Bakke, root rot. N. Dak. (1).
Phyllachora ammophilae Orton, tar spot. Mass. (1,2); N.J., N.Y. (1).
Puccinia ammophilina (Kleb.) Mains (II,III), rust. Oreg. (1), Mich. (2).
P. amphigena Diet. (II,III)—Ind. (2). O and I on *Leucocrinum* and *Smilax*.
P. coronata Cda. (II,III), crown rust. Mass., N.H. (1,2).
P. graminis Pers. f. sp. *avenae* Eriks. & E. Henn. (II, III), black stem rust. Calif. (1).
Pythium arrhenomanes Drechs., root browning. N. Dak. (1).
Telimena sp., tar spot. Mass. (1).
Tiarospora perforans (Rob. ex Desm.) Hoehn., on leaves. Oreg. (1).
Ustilago striiformis (West.) Niessl, stripe smut. Conn., Maine, Mass. (1,2).

Andropogon, beardgrass, bluestem

I. Section *Schizachyrium*

(1) *Andropogon scoparius* Michx., little bluestem, prairie beardgrass.
(2) Other species.

Perennial grasses of prairies, plains, and open woods; (1) ranging throughout the Eastern and Central States to the Rocky Mountains, a dominant element in short-grass prairies, valuable for forage and hay; other species in the South and Far West; useful to wildlife.

Ascochyta graminicola Sacc., leaf spot. Mass. (1).
Balansia epichloë (Weese) Diehl, black choke, sterility disease. N.C. (1).
B. henningsiana (Moell.) Diehl—Fla., Kans., La., Md., Mo., Va. (1).
Cerebella andropogonis Ces., blackhead (on inflorescences bearing *Sphacelia* stage of ergot). Kans. (1); Miss. (2).

Clathrospora dakotensis (Rehm) Hoehn., on culms. N. Dak. (1).
Claviceps purpurea (Fr.) Tul., ergot. Miss., Okla. (2).
Colletotrichum graminicola (Ces.) G.W. Wils., anthracnose. Conn., Ky. (1).
Didymosphaeria crastophila Niessl, on culms. N. Dak. (1).
Dothichloë: SEE *Balansia.*
Ellisiella caudata (Pk.) Sacc., on culms and leaves, ?leaf spot. Kans., Okla. (1).
Gnomonia andropogonis Ell. & Ev., on culms and leaves. N.Y. (1).
Leptostromella andropogonis Dearn. & House, on culms. Ala. (1).
Myriogenospora atramentosa (Berk. & Curt.) Diehl, tangle-top, fasciation. La., Tex. (1).
Phyllachora luteo-maculata (Schw.) Orton, tar spot. Ga., Mass., Minn., Pa., Va. (1). *P. brevifolia* Chardon—P.R. (2).
Puccinia andropogonis Schw. (II,III), leaf rust. General (1). Tex. (2). O and I on various Scrophulariaceae, also Leguminosae, Oxalidaceae, Polygalaceae, Rutaceae, and Santalaceae; sometimes segregated into varieties based on aecial hosts.
P. ellisiana Thuem. (II,III), leaf rust. General (1), Fla. (2). O and I on *Viola* spp.
P. kaernbachii (P. Henn.) Arth. (II,III)—Fla., C.Z. (2).
P. venustula Arth. (II,III)—P.R. (2).
Pythium debaryanum Hesse, root rot. N. Dak.
Sorosporium ellisii Wint., head smut. Conn., Fla., Ga., Ill., Kans., Miss., S. Dak. (1).
S. everhartii Ell. & Gall., kernel smut. Southern New England to Ala. and Miss. (1).
Sphacelotheca ischaemi (Fckl.) Clint. (*S. andropogonis* (Opiz) Bub.), head smut. Ill., Kans., Miss., N.C., N.J., Va. (1).
S. occidentalis (Seym.) Clint., seed smut. Va. (1).
S. seymouriana Clint.—Va. (1).
Uromyces andropogonis Tracy (II,III), leaf rust. N.C., N.J. O and I on *Viola* spp.
STOMATAL DROWNING — watersoaking of leaves and nonspecific bacterial invasion. N. Dak. (1).

II. Section *Arthrolophis*

(1) *Andropogon furcatus* Muhl., big bluestem, bluejoint turkeyfoot. Perennial grass of prairies and plains ranging from the Rocky Mountains to the Atlantic coast, the principal grass of the tall-grass prairie, valuable for forage and hay; useful to wildlife.
(2) *A. virginicus* L., broomsedge. Perennial bunchgrass of old fields and waste ground in the Eastern and Central States to Florida and Texas; useful to wildlife.
(3) Other species.

Apiospora montagnei Sacc., on culms. Ga. (2,3).
Ascochyta graminicola Sacc., leaf spot. N. Dak. (1).
Asteroma graminis West., on culms. Kans., Mo. (1).
Balansia henningsiana (Moell.) Diehl, black choke, sterility disease. Ala., Fla., Md., N.C., N.Y., Tenn. (2); Ala., Fla., Ga., Miss., P.R. (3). *B. strangulans* (Mont.) Diehl f. *discoidea* (P. Henn.) Diehl —Kans. (3).
Belonium andropogonis (Berk. & Curt.) Sacc., on culms. S.C. (3).
Cerebella andropogonis Ces., blackhead (on inflorescences bearing sphacelial stage of ergot). Ga., Kans., Tex. (1); Kans., Tex. (3).
Claviceps purpurea (Fr.) Tul., ergot. Ga., Kans., Tex. (1); Fla., Miss., Okla. (2,3).
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Ky., N. Dak., Oreg., Wis. (1); Ky. (3).
Ellisiella caudata (Pk.) Sacc., on culms and leaves, ?leaf spot. Kans., N. Dak., Wis. (1); Miss. (3).
Epichloë typhina (Pers. ex Fr.) Tul., choke, cat-tail. Wis. (1).
Fusarium scirpi Lambotte & Fautr., secondary root rot. Nebr. (1), N. Dak. (1,3).
Gnomonia andropogonis Ell. & Ev., on dead culms and leaves. Miss. (2); N.J. (3).
Graphyllium graminis (Ell. & Ev.) Rehm, on culms. Kans. (1), Ga. (2).
Helminthosporium sp., leaf spot. Minn. (1).
H. sativum Pam., King, & Bakke, root rot. N. Dak. (1,3).
Hysteropezizella andropogonis (Berk. & Curt.) Nannf., on culms. Ga. (3).
Leptosphaeria culmorum Auers., on culms. N. Dak. (1), Ga. (2). *L. muricata* Ell. & Ev.—Ga. (2).
Leptostromella andropogonis Dearn. & House, on culms. Ala. (2).
Lophodermium andropogonis Tehon, on culms. P.R. (3).
Meliola panici Earle, black mildew. C.Z., P.R. (3).
Metasphaeria infuscans Ell. & Ev., on dead culms. Ala., Ga., Miss. (2).
Myriogenospora bresadoleana P. Henn. (=*M. atramentosa* (Berk. & Curt.) Diehl?), fasciation. P.R. (3).
Papularia sphaerosperma (Pers. ex Lk.) Hoehn. (*Coniosporium arundinis* (Cda.) Sacc.), on culms. N.J. (2). *P. vinosa* (Berk. & Curt.) Mason—Fla. (2).
Phyllachora luteo-maculata (Schw.) Orton, tar spot. Mass. to Okla. and S. Dak. (1), N.J. to Fla. and La. (2), N. Mex. (3). *P. nervisequia* (Schw.) Orton—Fla., Ga., Tex., P.R. (on *A. glomeratus* (Walt.) B. S. P.; Pa. to Fla. and La., also P.R., on other species. *P. quadraspora* Tehon — Fla., P.R. (3).
Phyllosticta sp., leaf spot. N. Dak. (1).
Piricularia grisea (Cke.) Sacc., leaf spot. Tex. (3).
Puccinia andropogonis Schw. (II,III), leaf rust. N.Y. to Ala., Tex., and N. Dak. (1); Conn. to Ala., Tex., and Kans. (2); Ga. to N. Mex., Nev., and N. Dak. (3).
P. ellisiana Thuem. (II,III), leaf rust. N.Y. to Miss., N. Mex., and N. Dak. (1); Md., N.J., Tenn., Va. (2); N.C., N.J. (3).
P. tripsaci Diet. & Holw. (II,III)—Minn. and N. Dak. to Okla. and Colo. (1); Kans., N. Dak., Nebr. (3). O and I on *Ceanothus* spp.
Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, and Larson, pink root. N. Dak. (1,3).
Pythium arrhenomanes Drechs., root browning, seedling blight. N. Dak. (1,3).
P. debaryanum Hesse and *P. ultimum* Trow, seed rot, damping-off. Nebr., N. Dak. (1,3).
Rhopographus clavisporus (Cke. & Pk.) Sacc., on culms. Ga. (1).
Septoria andropogonis J. J. Davis, leaf spot. Kans., Wis. (1).
Sorosporium ellisii Wint., head smut. Ark., Del., N.J. (2); La., Md., Miss., N.J., Va. (3).
S. everhartii Ell. & Gall., seed smut. Mo. (1); N.J. to Ala. and La. (2); Fla., Va. (3).
S. provinciale (Ell. & Gall.) Clint., head smut. Ind. to Tex. and Nebr. (1); Tex. (3).
Sphacelotheca ischaemi (Fckl.) Clint., head smut. Kans., S. Dak., Tenn. (1).
S. occidentalis (Seym.) Clint., seed smut. Ind. to La., Colo., and N. Dak. (1); Calif., Kans., Nebr., N. Dak., S. Dak. (3).
S. seymouriana Clint.—Ala., N.C. (2); Ga. (3).
Stagonospora ischaemi Sacc., on culms. Ala. (1). *S. paspali* Atk.—Wis. (1).
Telimena sp., tar spot. Ill. (1); Fla. (3).
Tolyposporella brunkii (Ell. & Gall.) Clint., leaf smut. P.R. (3).

Uromyces andropogonis Tracy (II,III), leaf rust. N.Y. to Fla., La., and Mo. (2,3).
Ustilago striiformis (West.) Niessl, stripe smut. Ohio (2).
BENDS (hairpin)—cause unknown. N. Dak. (1), Wash. (3).
STOMATAL DROWNING — watersoaking of leaves and bacterial invasion. N. Dak. (*).

III. Section *Amphilophis*

(1) *Andropogon saccharoides* Swartz, silver beardgrass. Perennial grass of southern United States and West Indies to California; sometimes grown for ornament.
(2) Other species.

Cerebella andropogonis Ces., blackhead, following ergot. Okla., Tex. (1).
Claviceps purpurea (Fr.) Tul., ergot. Tex. (1).
Phyllachora luteo-maculata (Schw.) Orton, tar spot. Okla. (1), Tex. (1,2).
Sphacelotheca ischaemi (Fckl.) Clint., head smut. Ariz., Tex. (1). *S. andropogonis-hirtifolii* (P. Henn.) Clint.—Ariz. (1).
Tolyposporella brunkii (Ell. & Gall.) Clint., leaf smut. Tex. (1).

Anthaenantia, silky-scale

(1) *A. rufa* (Ell.) Schult., purple silky-scale.
(2) *A. villosa* (Michx.) Beauv., green silky-scale.

Perennial grasses of pine barrens of the Coastal Plain from North Carolina to Texas; of minor forage value; useful to wildlife.

Cerebella anthaenantiae Tracy & Earle (=*C. andropogonis* Ces.?), on ergot-infected inflorescences. Miss.
Claviceps sp. (*?purpurea* (Fr.) Tul.), ergot. Miss.
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Fla.

Anthoxanthum

(1) *A. odoratum* L., sweet vernalgrass.
(2) *A. aristatum* Boiss., annual vernalgrass.

Perennial (1) or annual (2) meadow grasses of Europe, sometimes used in hay mixtures for fragrance, naturalized in the Eastern and East Central States.

Cladosporium graminum Pers. ex Lk., leaf mold. Oreg. (1).
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Ky., Oreg. (1).
Helminthosporium dematoideum Bub. & Wrób., secondary leaf spot. Md., N.Y., Oreg. (1).
Phyllosticta anthoxella Sprague, on leaves. Oreg. (1).
Puccinia graminis Pers. (II,III), stem rust. Del., Maine, N.J., N.Y. (1); Miss. (2). The f. sp. *avenae* Eriks. & E. Henn. identified.
P. poae-sudeticae (West.) Jørst. (II), leaf rust. Maine, ?Md. (1).
Synchytrium sp., purple leaf speck. Oreg. (1).
Tilletia anthoxanthi Blytt, seed smut. Conn., Pa. (1).

Aristida, three-awn

(1) *A. adscensionis* L., six-weeks three-awn.
(2) *A. longiseta* Steud., red three-awn.
(3) *A. oligantha* Michx., prairie three-awn.
(4) Other species.

Annual (1,3) or perennial (2) grasses, usually on dry plains and waste ground; some are of minor forage value when young; useful to wildlife.

Balansia aristidae Atk., black choke, sterility disease. Ala., Fla., Ga., Miss., Tex., Va., P.R. (4, especially *A. purpurascens* Poir).
B. hemicrypta Diehl—N. Mex., Tex. (4).
Euryachora aristidae (Schw.) Th. & Syd., tar spot. Fla., Ga., Md., Miss., N.C., N.J., Pa. (4); commonly on *A. purpurascens*.
Graphyllium chloës Clements, on culms. N. Dak., Nebr. (4). *G. graminis* (Ell. & Ev.) Rehm—Ga. (4).
Hendersonia effusa Berk. & Curt., on dead culms. Ala., Miss., N.C. (4).
Puccinia aristidae Tracy (II,III), rust. Calif., N. Mex. (1); Tex. (4). O and I on numerous dicotyledonous genera. SEE ALSO *Uromyces peckianus*.
Selenophoma everhartii (Sacc. & Syd.) Sprague & A. G. Johns., leaf spot. N. Dak. (2), Iowa (3).
Sorosporium consanguineum Ell. & Ev., seed smut. Tex. (1); Colo., Idaho, Kans., Nebr., Wash. (2); Ariz., Calif., Colo., Kans., N. Mex., S. Dak., Tex. (4). *S. confusum* Jacks.—Ala., Calif., Colo., Del., Fla., Ind., Ohio, Pa., Tex.
Tilletia oklahomae Zundel, seed smut. Okla. (4).
Uromyces aristidae Ell. & Ev. (II,III), rust. N. Mex. (4). O and I unknown.
U. peckianus Earl. (II,III)—Colo. (2), widespread on (3) and other species in their range from N.Y. to Ala., Tex., Nebr., and Wis. O and I as in *Puccinia aristidae*.

Arrhenatherum, oatgrass

(1) *A. elatius* (L.) Presl, tall oatgrass.
(2) *A. elatius* var. *bulbosum* (Willd.) Spenner, tuber oatgrass.

Perennial grasses of Europe: (1) cultivated in the Northern and Eastern States for forage and hay, and widely escaped; (2) introduced for trial as a meadow grass.

Ascochyta graminicola Sacc., purple leaf speck. Oreg. (1).
Cladosporium graminum Pers. ex Lk., leaf mold. Wash. (1).
Claviceps purpurea (Fr.) Tul., ergot. Ind., Ky., Mo., Mont., Ohio, Oreg., Wis. (1).
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Minn., N. Dak., Ohio, Oreg., Va. (1).
Helminthosporium avenae Eidam, leaf blotch. Calif. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. N. Dak. (1).
Meloidogyne sp., root knot nematodes. ?Fla., S.C. (1).
Ovularia pulchella (Ces.) Sacc., leaf spot. Oreg. (1).
Pseudodiscosia avenae Sprague & A. G. Johnson, red leather-leaf. Wash. (1).
Pseudomonas coronafaciens (Elliott) F. L. Stevens, halo blight. Calif. (1).
Puccinia coronata Cda. (II,III), crown rust. La., Minn. (1).
P. graminis Pers. (II,III), stem rust. Ind., La., Mich., Minn., N.Y., Oreg., Wash., W. Va. (1). The f. sp. *avenae* Eriks. & E. Henn. identified.
P. montanensis Ell. (II,III), brown stripe rust. Mich. (1).
Pythium aristosporum Vanterpool, root browning. Mont. (1). *P. arrhenomanes* Drechs. — N. Dak.

(1). *P. debaryanum* Hesse, root necrosis. N. Dak. (1).
Sclerotium rolfsii Sacc., southern blight. La. (1).
Scolecotrichum graminis Fckl., leaf streak. Ky., Md., Mich., Mont., Oreg., Pa., Wash. (1); Miss., N.Y. (2).
Selenophoma donacis (Pass.) Sprague & A. G. Johnson, var. *stomaticola* (Baeumler) Sprague & A. G. Johnson, leaf spot. Mont. (1).
Septogloeum oxysporum Sacc., Bomm., & Rouss., char spot. Oreg. (1).
Septoria avenae Frank (=*Stagonospora arrhenatheri* A. L. Sm. & Ramsb.), leaf blotch. Pa., Wash. (1).
Ustilago avenae (Pers.) Rostr. (*U. perennans* Rostr.), head smut. N.Y. to Ga., Mo., and Minn.; Oreg., Wash. (1).

Arundinaria, cane

(1) *A. gigantea* (Walt.) Chapm., southern (giant) cane.
(2) *A. tecta* (Walt.) Muhl., small cane.

Tall, reedlike perennial grasses forming large colonies in river lowlands in the Southeastern and Gulf States; used for poles and in making baskets and mats; the young sprouts furnish forage and greens.

Apiospora montagnei Sacc., on dead culms. Ala., La., Miss. (1,2).
Aulographum arundinariae Cke., on dead culms. Ga. (1).
Botryosphaeria arundinariae Earle, on dead culms. Ala., La. (1).
Cercospora scolecotrichoides Atk.: See *Scolecotrichum graminis.*
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Miss., S.C. (1).
Coniosporium spp., on dead or partly dead culms and leaves, superficial or innate: See *Papularia. C. arundinis* (Cda.) Sacc., *C. bambusae* (Thuem. & Bolle) Sacc., *C. gramineum* (Ell. & Ev.) Sacc., and *C. shiraianum* (Syd.) Bub., as reported on *Arundinaria,* appear to be only growth forms of *Papularia sphaerosperma.*
Diatrype consobrina Mont. (*?Eutypella arundinariae* Berl.), on culms. La., Miss. (1,2).
Dicellomyces gloeosporus L. S. Olive, leaf spot. Ala., Ga., N.C. (2).
Didymosphaeria arundinariae Ell. & Ev., on culms. Ga. (2).
Dothidella minima Sacc. & Syd., on fading leaves. La. (1).
Echinodothis tuberiformis (Berk. & Rav.) Atk., on culms. Ala. (2).
Hypoderma scirpinum DC., on culms. Miss. (1).
Hypoxylon culmorum Cke., on dead culms. Fla., Ga., La. (1,2).
H. rubiginosum Pers. ex Fr.—Ala., Ga. (1,2).
Leptosphaeria arundinacea (Sow. ex Fr.) Sacc., on dead culms. S.C. (1). *L. culmicola* (Fr.) Karst. —Ga. (2). *L. eumorpha* (Berk. & Curt.) Earle—Ind., S.C. (2).
Leptothyrium cylindrium Atk., leaf spot. Ala. (2).
Lophodermium arundinaceum (Schrad. ex Fr.) Chev., on culms. Ala., Ga., S.C. (1,2).
Melanconium arundinaceum Ell. & Ev.: See *Papularia vinosa.*
Meliola tenuis Berk. & Curt., black mildew. Ala., Ga., Miss. (1,2).
Metasphaeria rimularum (Cke.) Sacc., on culms. Fla., Ga. (1).
Mycosphaerella arundinariae (Atk.) Earle, leaf spot. Ala. (2).
Ophiobolus stictisporus (Cke. & Ell.) Sacc., on culms. Ga. (2).
Papularia sphaerosperma (Pers. ex Lk.) Hoehn., also var. *inquinans* (Dur. & Mont.) Grove (*P. arundinis* (Cda.) Fr.), on dead culms and leaves. Cosmopolitan.
P. vinosa (Berk. & Curt.) Mason—Fla., La.
Phyllachora arundinariae Orton, black leaf speck. Ala., Ga., Miss., S.C. (2).
Physalospora conica Ell. & Ev., on culms. La. (1).
Puccinia arundinariae Schw. (II,III), leaf rust. N.C. to Ala., Tex., and Okla. (1,2). O and I unknown, perhaps on *Smilax.*
Pyrenopeziza arundinariae (Berk. & Curt.) Sacc., on culms. Ala., Miss., N.C., S.C. (1,2).
Sclerotium sacidioides Speg., on leaves. Va. (2).
Scolecotrichum graminis Fckl., brown stripe. Ala. (2).
Stigmatea sclerotidea Cke., on leaves. Ga., S.C. (2).
Volutella tecticola (*tectaecola*) Atk., leaf spot. Ala. (2).

Arundinella

A. confinis (Schult.) Hitchc. & Chase
Coarse perennial grass of the West Indies.

Phyllachora arundinellae Orton, black leaf speck. P.R. Antedated by *P. arundinellae* Doidge, but perhaps identical.

Arundo

A. donax L., giant-reed.

Tall perennial grass of tropical regions, cultivated for ornament and naturalized in the Gulf States to southern California; the culms used for baskets, mats, and screens.

Armillaria mellea Vahl ex Fr., root rot. Md.
Coniosporium: See *Papularia.*
Leptostroma donacis Schw., on culms. N.C.
Papularia sphaerosperma (Pers. ex Lk.) Hoehn., also var. *inquinans* (Dur. & Mont.) Grove, on dead culms and leaves. General. *P. vinosa* (Berk. & Curt.) Mason—Tex. Both species produce anthracnose-like lesions on canes, the latter especially on partly green canes, and also grow saprophytically on dead canes and leaves; sometimes reported as causing dieback and leaf spot.
Puccinia coronata Cda. (II,III), crown rust. Calif.
Selenophoma donacis (Pas.) Sprague & A. G. Johnson, stem speckle. Calif.

Avena

I. Annuals, Cultivated Cereals and Forage Crops

(1) *Avena sativa,* cultivated oats. Cutigen derived chiefly from (2) *A. fatua* L., wild oats; (3) *A. sterilis* L., animated oats; and (4) *A. barbata* Brot., slender oats. These foundation species are also naturalized and are used for forage or hay especially in the Pacific Coast States; (2) is widely distributed as a weed; (3) is sometimes grown as a novelty and is the source of the cultigen, *A. byzantina* C. Koch, red oats. Several agronomic forms of (1) are distinguished and are grown in particular districts or are used in breeding, such as (5) *A. brevis* Roth, (6) *A. nuda* L., and (7) *A. strigosa* Schreb.

Alternaria sp. (*?A. tenuis* Nees ex Cda.), secondary leaf and glume spot. Idaho, Ind., Mo., N.Y., Vt. (1).

Anguina tritici (Steinbuch) Filip., spikelet nematode. Va. (1).

Aphanomyces camptostylus Drechs., secondary root rot. Minn., Wis. (1). *Aphanomyces* sp.—Mont., Oreg.

Ascochyta graminicola Sacc., leaf spot. Ga. (1).

Ascochytella avenae Petr., white leaf spot. Wash. (2), Oreg. (3).

Botrytis cinerea Pers. ex Fr., head mold. Minn. (1).

Cercosporella herpotrichoides Fron, foot rot. Oreg., Wash. (resistant).

Cladosporium graminum Pers. ex Lk., leaf mold. Ala., Iowa, Minn., Tex., Va., W. Va. (1); Oreg., Wash. (3). Cited by most authors, following Saccardo, as *C. graminum* Cda. but was published earlier by Link; it may not be distinguishable from *C. herbarum* Pers. ex Lk. but on grass hosts is usually segregated. Is perhaps the conidial stage of a *Mycosphaerella* of the *M. tassiana* (de N.) Johans. type.

Claviceps purpurea (Fr.) Tul., ergot. Colo., Iowa, Kans., Mich., Minn., N. Dak., N.Y., Okla., Wash. (1).

Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. General (1).

Cuscuta sp., dodder. Tex. (1).

Ditylenchus dipsaci (Kuehn) Filip., stem nematode. Calif., S.C. (1).

Epicoccum neglectum Desm., leaf mold. Oreg. (2).

Erysiphe graminis DC., powdery mildew. N.Y. to N.C., Mo., and Mich., also Ariz., Calif., Idaho, Oreg., Utah, Wash. (1); Oreg. (2,3). Sometimes distinguished as f. sp. *avenae* Em. Marchal, and experimentally shown to be restricted to *Avena* but able to infect all tested species and varieties.

Fusarium spp., seedling blight, foot rot, head mold. *F. avenaceum* (Fr.) Sacc., *F. culmorum* (W. G. Sm.) Sacc., and *F. graminearum* Schwabe have been reported as causing one or another of these diseases. In the terminology of Hansen and Snyder all are forms of *F. roseum* Lk. (=*Gibberella roseum* Lk. ex Snyd. & Hans.). Some authorities hold that *F. avenaceum* is only weakly parasitic but may cause head mold; it is reported in Calif. and Ohio. *F. culmorum* is said to cause preemergence seedling blight and foot rot, and is reported from Iowa, Minn., Mo., Utah, and especially the Pacific Coast States; it is also one cause of red leaf in Oreg. and Wash. *F. graminearum:* SEE *Gibberella zeae.* Other species reported are: *F. moniliforme* Sheldon, seedling blight, secondary root rot—Minn., N. Dak.; *F. oxysporum* Schlecht., secondary root rot—N. Dak.; *F. poae* (Pk.) Wr. (=*F. tricinctum* Cda., according to Snyd. and Hans.), head mold—Oreg.; *F. scirpi* Lambotte & Fautr. (=*F. roseum* Lk. ex Snyd. & Hans.), secondary root rot—N. Dak. The foregoing reports all pertain to (1). *F. culmorum* is also reported as causing root rot on (2) and (3), *F. oxysporum* secondary root rot on (3), and *F. poae,* head blight on (3), in Oreg.

Fusicladium destruens Pk., leaf mold. N.Y. (1). Probably *Cladosporium graminum* or *Helminthosporium avenae* in part.

Gibberella zeae (Schw.) Petch, head mold, scab. N.Y. to Md., Tex., and N. Dak. (1).

Helminthosporium avenae Eidam: SEE *Pyrenophora avenae. H. avenaceum* Curt., originally reported on straw and of doubtful identity, has also been reported on leaves in Calif., Miss., N. Dak., and Tex.; in a sense probably identical with *H. avenae.*

H. sativum Pam., King, & Bakke, seedling blight, root rot, foot rot. Occasional in Eastern and Central States to S.C. and N. Dak. (1); N. Dak. (2); Oreg. (1,3).

H. victoriae Meehan & Murphy, leaf blight. Throughout the Central States to N.Y., Fla., Tex., and Mont., on varieties derived from Victoria oats.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Heterosporium avenae Oud., leaf mold. Oreg.

Leptosphaeria avenaria G. F. Weber, speckled blotch. Eastern and Central States to Ark. and N. Dak. (1). Usually reported in the pycnidial stage, *Septoria avenae* Frank.

Marasmius tritici P. A. Young, on culms, ? collar rot. Ill. (1).

Meloidogyne sp., root knot nematodes. N.J. (1); Calif. (2,4); T.H. (1,2).

Ophiobolus graminis Sacc., foot rot. Oreg. (1,3); Calif. (3).

Pholiota praecox (Pers.) Fr., on roots, ?parasitic. Oreg. (1).

Phyllosticta avenophila Tehon & Daniels, leaf spot. Ill., Miss. (1).

Phytophthora cactorum (Leb. & Cohn) Schroet., leaf rot. Calif., Oreg. (2). *Phytophthora* sp. (*?colocasiae* Rac.)—Calif. (1).

?Polymyxa graminis Ledingham, in roots. S.C. (1).

Pratylenchus pratensis (De Man) Filip., root nematode. Oreg., Tex. (1).

Pseudodiscosia avenae Sprague & A.G. Johnson, red leather-leaf. Oreg., Wash. (1,3).

Pseudomonas coronafaciens (Elliott) F. L. Stevens, halo blight. N.Y. to Ga., Tex., Calif., and Idaho, general except the Gulf and North Pacific States (1); Kans. (2).

P. striafaciens (Elliott) Starr & Burkh., bacterial stripe. Va. and N.C. to Nebr. and N. Dak.; Calif., Oreg. (1).

Puccinia coronata Cda. (II,III), crown rust. General, especially severe in the South (1, including 5,6,7); Central and Western States (2); occasional in Western States (3,4). The races on oats constitute the f. sp. *avenae* Eriks. & E. Henn., or variety *avenae* Fraser & Ledingham. O and I on *Rhamnus* spp., especially *R. cathartica.*

P. graminis Pers. (II,III), stem rust. General (1, including 5,6,7); Central and Western States (2); Calif., Oreg. (3,4). The races on oats constitute the f. sp. *avenae* Eriks. & E. Henn. O and I on *Berberis* spp.

P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Ala., Calif., Ind., N.C., Okla., Tex. (1); Calif. (2,4). O and I on various Ranunculaceae.

Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, pink root, secondary root rot. N. Dak. (1).

Pyrenophora avenae Ito & Kurib., leaf stripe (blotch). General (1,2,3). Usually reported in conidial stage, *Helminthosporium avenae.*

Pythium spp: *P. debaryanum* Hesse, *P. irregulare* Buis., and *P. ultimum* Trow, preemergence damping-off, seedling blight. North Central States to Oreg. and Wash. (1). *P. arrhenomanes* Drechs. and *P. graminicola* Subr., root browning: the former reported in Minn., N. Dak., S. Dak., ?Mont., ?Nebr. (1); N. Dak. (2); the latter in Iowa and Calif. The 2 species are distinguishable with difficulty if at all. Other species reported: *P. aristosporum* Vanterpool, root browning. Oreg. (1); *P. rostratum* Butl., root necrosis. Calif., Wash. (1); *P. tardicrescens* Vanterpool, root browning. Wash. (2).

Rhizoctonia solani Kuehn, root rot, culm rot (?secondary). Reported from Mich., Minn., N. Dak., Wash., probably cosmopolitan (1); also a virulent race in Oreg. (1,2,3).

Sclerospora macrospora Sacc., downy mildew. Colo., Idaho, Ind., La., Miss. (1).
Sclerotium rolfsii Sacc., seedling blight. Ark., Miss. (1).
Scolecotrichum graminis Fckl., brown stripe. Ill., Iowa, Kans., N.Y. (1).
Septoria avenae Frank: See *Leptosphaeria avenaria*
Septoria tritici Rob. ex Desm. f. *avenae* (Desm.) Sprague, leaf spot. Oreg., Wash. (1,2,3).
Tylenchus spiralis Cassidy, root nematode. T.H. (1).
Ustilago avenae (Pers.) Rostr., loose smut. General (1); Calif., Md., Wash. (2); Oreg., Tex., Wash. (3); Mo. (6).
U. kolleri Wille (*U. levis* (Kell. & Swing.) Magn.), covered smut. General (1); Kans. (2); Oreg., Tex., Wash. (2,3). Some authorities regard this as a form of *U. hordei* (Pers.) Lagh.
Wojnowicia graminis (Mc Alp.) Sacc. & D. Sacc., secondary root rot. Oreg., Wash. (1).
Mosaic—virus (*Marmor terrestre* McK.). Ala., Ga., N.C., S.C., ?Oreg. (1). Two varieties have been distinguished. Var. *typicum*, causing apical mosaic; var. *oculatum* causing eyespot mosaic.
Red spot mosaic—suspected virus. Ark. (1).
Blast (sterility)—physiological, attributed to high temperature and drought. Occasional to general in some years (1).
Crazy top (proliferation of inflorescence) — cause unknown. Oreg. (1).
Gray speck—physiological, attributed to manganese deficiency. Ind., Kans., S.C. (1).
Red leaf—physiological, attributed to low temperature and wet soil during early growth, or to incipient root and leaf infection. Occasional, on particular varieties, N.Y. to Ga. and Kans., especially in the North. See also *Helminthosporium* and *Pythium*.

II. Native Perennial Grasses

Avena hookeri Scribn., spike oat. On plains and foothills, Montana and North Dakota to New Mexico.

Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. N. Dak.
Puccinia coronata Cda. (II,III), crown rust. Mont.
P. graminis Pers. f. sp. *avenae* Eriks. & E. Henn. (II, III), stem rust. Reported in literature without locality.

Axonopus, carpetgrass

(1) *A. affinis* Chase, common carpetgrass.
(2) *A. compressus* (Swartz) Beauv., tropical carpetgrass.
(2) *A. furcatus* (Flügge) Hitchc., big carpetgrass.

Perennial grasses of the Southeastern States and Gulf Coastal Plain (1,3) or in Florida and the West Indies (2): (1,2) used in pastures and sometimes as a lawn grass on sandy soil; (3) affords some pasturage in pine barrens and marshy ground; useful to wildlife.

Angiopsora compressa Mains (II,III), rust. La., P.R. (2).
Ascochyta sp., on seed. Md. (1).
Balansia strangulans (Mont.) Diehl, black choke. Fla. (1,?2).
Cerebella andropogonis Ces. (*C. panici* Tracy & Earle, *C. paspali* Cke. & Mass.), on ergot-infected heads. Gulf States to Md. (1), Fla. (2).
Claviceps sp. (*?C. purpurea* (Fr.) Tul.), ergot. Fla., Ga. (1), probably general as indicated by records of *Cerebella*.
Curvularia sp., mold, leaf spot. Ga. (1).
Fusarium graminum Cda., head mold, usually following ergot. Ga., Miss., Tex. (1).
Gnomonia iliau Lyon (*Melanconium iliau* Lyon), on culms. Fla. (3).
Helminthosporium sp., leaf spot. Tex. (1).
H. ravenelii Berk. & Curt., false smut. Miss. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Ga. (1).
Myriogenospora bresadoleana P. Henn. (=*M. atramentosa* (Berk. & Curt.) Diehl?), tangle-top. P.R. (2).
Rhizoctonia solani Kuehn, brown patch. Fla., La., T.H. (1,2).
Trichostroma axonopi Tehon, on leaves. P.R. (2).

Bambuseae (tribe), bamboo

(1) *Bambusa multiplex* Raeusch, hedge bamboo.
(2) *B. vulgaris* Schrad., common bamboo.
(3) *Phyllostachys aurea* Riv., golden bamboo.
(4) *P. bambusoides* Sieb. & Zucc., Japanese timber bamboo.
(5) *P. nigra* Munro, blackjoint bamboo.
(6) Other species.

The bamboos are grouped under the tribe name instead of the different genera because of the confused state of generic differentiation; *Arundinaria* and *Arundo* are treated separately. The species listed are large perennial, woody grass allies, indigenous to southeastern Asia, and are grown in warm parts of the United States for ornament or rods and poles.

Apiospora sp., on dead culms. Fla., Ga. (4,6). See also *Scirrhia*.
A. striola (Pass.) Sacc.—C.Z. (6).
Cladosporium graminum Pers. ex Lk., leaf mold. Oreg. (3); S.C. (6).
Coniosporium spp. (*C. bambusae* (Thuem. & Bolle) Sacc., *C. shiraianum* (Syd.) Bub., and others). See *Papularia*.
Cylindrosporium bambusae Miyake & Hara, on culms. Ga. (6).
Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., on dead culms. Md. (6).
Diplodia bambusae Ell. & Langl., on culms, ?tip blight. La., Tex. (6).
Fusarium merismoides Cda., on cut canes. Ga. (6).
Guignardia bambusae Miyake & Hara, on culms. Md. (6).
Helminthosporium sp., leaf spot. Fla. (6).
Hendersonia sp., on culms. La. (6).
Laestadia sp., on culms. Fla. (4).
Melanconium bambusae Turc.: See *Papularia vinosa*. Said to be the conidial stage of *Scirrodothis bambusae*.
M. saccharinum Penz. & Sacc.: See *P. vinosa*.
M. sphaerospermum Pers. ex Lk.: See *P. sphaerosperma*.
Munkia chusqueae (F. L. Stevens) Marchionatto, on stems. C.Z.
Mycosphaerella sp., leaf spot (?secondary). Calif. (4, 5,6).
Nigrospora oryzae (Berk. & Br.) Petch, on senescent leaves. Fla. (4).
Papularia sphaerosperma (Pers. ex Lk.) Hoehn. (including *P. arundinis* (Cda.) Fr.), on dead or

moribund culms, ?dieback. Cosmopolitan (*). See note under *Arundinaria*.
P. vinosa (Berk. & Curt.) Mason, on dead or sometimes living culms, ?dieback. Fla. (2), Ga. (4), Tex., P.R. (6). Most records of *Melanconium* sp. on bamboo belong here.
Phyllachora chusqueae P. Henn. & Lindau, black leaf spot. C.Z. (6).
P. portoricensis (Chardon) Orton—P.R. (6).
Puccinia ignava Arth. (II), rust. Ga. (6), P.R. (2). Tentatively assigned to *Puccinia* though III stage not yet observed.
P. melanocephala Syd. (II,III), leaf rust. Fla., Ga., Miss., Tex. (2,3,4,6). O and I unknown.
Schizophyllum commune Fr., on dead culms. Calif. Root rot (?). Tex.
Scirrhia lophodermioides Ell. & Ev., on dead culms. Fla. (4), T.H. (6).
Scirrhodothis bambusae (Turc.) Trott., on dead culms. Fla., Ga. (6). Reputed to be the ascigerous stage of *Melanconium bambusae*. SEE ALSO *Apiospora* and *Scirrhia*.
Sclerotium rolfsii Sacc., culm rot. P.R. (2).
Selenophoma donacis (Pass.) Sprague & A. G. Johnson, culm spot. Calif. (6).
Ustilago shiraiana P. Henn., stem smut. Calif., Fla., La., Md., Miss., Tex. (4,5,6). Occasional on introduced plants but not established on endemic plantings.
MOSAIC—unidentified virus. T.H. (6).

Beckmannia

(1) *B. syzigachne* (Steud.) Fern., American sloughgrass.
(2) *B. erucaeformis* (L.) Host, European sloughgrass.

Coarse annual of moist habitats in the North Central States and northern Plains to California (1); of minor forage value. European homologue (2) to which the American form was referred earlier; sometimes grown locally.

Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Minn., N. Dak. (1).
Erysiphe graminis DC., powdery mildew. Mo., Mont., S. Dak. (1).
Helminthosporium sp., leaf spot. Mich. (2).
H. catenarium Drechs.—N. Dak. (1).
Puccinia coronata Cda. (II,III), crown rust. Calif., Colo., Iowa, Minn., N. Dak., S. Dak. (1).
P. graminis Pers. (II,III), stem rust. N. Dak., Oreg., Utah (1); Mich. (2).
Scolecotrichum graminis Fckl., brown stripe. N. Dak., Oreg., Wash. (1).
Septoria spartinae (Trel.) Sprague, on dead culms. N. Dak. (1).
Uromyces beckmanniae Jacks. (II,III), rust. Oreg. O and I unknown.
Ustilago striiformis (West.) Niessl, stripe smut. Oreg. (1).

Blepharoneuron

B. tricholepis (Torr.) Nash, pine dropseed.

Annual, of foothills and mesas in the southern Rocky Mountains; of minor forage value.

Phyllachora vulgata Th. & Syd., tar spot. N. Mex.

Bouteloua, grama

(1) *B. curtipendula* (Michx.) Torr., side-oats grama.
(2) *B. eriopoda* Torr., black grama.
(3) *B. gracilis* (H.B.K.) Lag., blue grama.
(4) *B. hirsuta* Lag., hairy grama.
(5) Other species.

Mostly perennial grasses of prairies and plains: (1) widely distributed, an important forage grass throughout the Great Plains and sometimes grown for hay in the Northeast; (2) chiefly in the southern Plains; (3) and (4) also in the Northern Plains and Central States; valuable for forage in the short-grass regions.

Ascochyta boutelouae Fairm., on fading leaves. N. Dak., N. Mex. (3). Perhaps a synonym of *Diplodina graminea* Sacc.
Balansia strangulans (Mont.) Diehl f. *discoidea* (P. Henn.) Diehl, black ring. Kans. (1).
Cercospora sp., leaf spot. Ky.
C. boutelouae Chupp & H. C. Greene—Okla., Wis. (1).
Claviceps purpurea (Fr.) Tul., ergot. Nebr. (1), Okla. (5).
Curvularia geniculata (Tracy & Earle) Boed., secondary root rot. Mont., N. Dak. (3).
Epichloë typhina (Pers. ex Fr.) Tul., choke. Kans., Nebr. (3).
Fusarium spp., root and culm rot (?secondary). N. Dak., Nebr. (1,3). The following species noted: *F. equiseti* (Cda.) Sacc., *F. oxysporum* Schlecht., *F. poae* (Pk.) Wr., *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., *F. sporotrichioides* Sherb.
Graphyllium chloës Clements, on dead culms. Nebr. (3).
Helminthosporium inconspicuum Cke. & Ell. var. *buchloës* Ell. & Ev., on fading leaves, sometimes on roots. Kans., N. Dak., Nebr. (1,3); Wis. (1,4). The varietal name is a nomen nudum; the species is perhaps a synonym of *H. turcicum* Pass.
H. sativum Pam., King, & Bakke, root rot. Minn., N. Dak. (1,3).
Lophodermium arundinaceum (Schrad. ex Fr.) Chev., on dead leaves.
Phyllachora boutelouae Rehm, tar spot. Ill., Iowa, Kans., Tex., Wis. (1); N. Dak., N. Mex., Nebr., S. Dak. (3); Wyo. (4); P.R. (5).
Pleospora oligostachyae Ell. & Ev., on dead leaves. Kans. (3).
Puccinia bartholomaei Diet. (II,III), rust. Iowa to Miss., Ariz., and S. Dak., also Md. (1); N. Dak. and Mont. to Tex. and Ariz. (3); Nebr. (4). O and I on *Asclepias* spp.
P. boutelouae (Jennings) Holw. (II,III)—Ariz., Tex. (1). Other reports from Kans., Nebr., and Okla. are perhaps confused with *P. stakmanii* and *P. vexans*. O and I unknown.
P. graminis Pers. (II,III), stem rust. Natural infection (1,3) recorded without locality in Plant Dis. Rptr. Sup. 130.
P. stakmanii Presley (II,III), leaf rust. Ariz., Tex. (5). All tested species of *Bouteloua* are susceptible; some reports of *P. vexans* may be this. O and I on *Gossypium hirsutum*.
P. vexans Farl. (II,III)—Ind. to Miss., Ariz., and N. Dak. (1); ?Kans., Nebr. (3).
Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, pink root. N. Dak. (1,3).
Pythium arrhenomanes Drechs., root browning, seed rot. N. Dak. (1,3). *P. debaryanum* Hesse, root necrosis. N. Dak. (1,3).
Rhizoctonia solani Kuehn, root rot. N. Dak. (1,3).
Rhynchosporium secalis (Oud.) J. J. Davis, on leaves. Nebr. (4).
Scaphidium boutelouae Clements, on dead leaves. Nebr. (4).
Selenophoma everhartii (Sacc. & Syd.) Sprague & A.

G. Johnson, leaf spot, stem-speckle. N. Dak., Wis. (1).
Ustilago boutelouae Kell. & Swing., head smut. Kans., La., Nebr., Okla. (3); Tex. (3,4); Ariz. (5).
U. hieronymi Schroet., leaf smut. Ind. to Tex., Utah, and N. Dak. (1); Ariz., N. Mex. (2,5); N. Dak. to Tex., Utah, and Mont. (3); Ariz., Colo., P.R. (5).
U. minor Norton—Kans., Nebr. (4).

Brachiaria, signalgrass

(1) *B. ciliatissima* (Buckl.) Chase
(2) *B. extensa* Chase

Native grasses of waste ground in the Gulf coast region to Arkansas and Oklahoma; useful to wildlife.

Curvularia lunata (Wakk.) Boed., on roots. Fla.
Helminthosporium sp., leaf spot. Fla.
Mosaic—virus (*Marmor sacchari* Holmes, Saccharum virus 1 K.M.Sm.). La. (2).

Brachyelytrum

B. erectum (Schreb.) Beauv., shorthusk.

Perennial grass of woodlands in the Eastern and Central States and southward.

Stagonospora brachyelytri H. C. Greene, leaf spot. Wis.
S. rubi-albida Dearn. & House—N.Y.
Uromyces halstedii DeT. (II,III), rust. N.Y. O and I on *Trillium* spp.

Brachypodium

B. sylvaticum (Huds.) Beauv., slender false-brome.

Perennial grass of Mediterranean region, sometimes grown for ornament.

Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Md.
Curvularia geniculata (Tracy & Earle) Boed., secondary root rot. N. Dak.
Fusarium scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N. Dak.
Pseudomonas coronafaciens (Elliott) F. L. Stevens. var. *atropurpurea* (Reddy & Godkin) Stapp, chocolate spot. N. Dak.

Briza, quakinggrass

Briza spp.

Annual or perennial grasses of Europe, sparingly adventive in the United States, of minor forage value; *B. maxima* L. sometimes grown for ornament.

Puccinia graminis Pers. (II,III), stem rust. Minn., S. Dak., Wis. (on all tested species.)

Bromus, bromegrass, chess

I. Native Perennial Species

(1) *Bromus anomalus* Rupr., nodding brome.
(2) *B. carinatus* Hook. & Arn., mountain brome, including the related species *B. marginatus* Nees, *B. maritimus* (Piper) Hitch., and *B. polyanthus* Scribn.
(3) *B. ciliatus* L., fringed brome.
(4) *B. pumpellianus* Scribn.
(5) *B. purgans* L., Canada brome.
(6) Other species.

Range grasses of plains, mountain meadows, and open woods: (1) and (4) localized, in the Plains and Rocky Mountain States; (2) widely distributed; (3) mostly western but also in the Northeast; (5) throughout the Middle West and East. All are valuable forage grasses.

Alternaria sp., inflorescence mold. Oreg. (2).
Ascochyta graminicola Sacc. var. *diedickeana* Baudyš & Picb., leaf spot. Oreg. (2).
Centrospora bromi (Sprague) Newhall, leaf spot. Oreg. (on *B. vulgaris*).
Cercosporella herpotrichoides Fron, foot rot. Idaho (2).
Cladosporium graminum Pers. ex Lk., leaf mold. Iowa (5).
Claviceps purpurea (Fr.) Tul., ergot. Mont. to Nev. and Wash. (2); Mont. (3).
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Okla. (2); Iowa, Minn., N. Dak., Wis. (5,6).
Erysiphe graminis DC., powdery mildew. Idaho, Mont., Oreg., Wash., Wyo. (2); Wash. (6).
Fusarium nivale (Fr.) Ces., snow mold. Oreg., Wash. (2). Conidial stage of *Calonectria nivalis* Schaff.
Helminthosporium bromi Died.: See *Pyrenophora bromi*.
H. sativum Pam., King, & Bakke, root rot, leaf spot. N. Dak., Oreg., Wash. (2).
Heterosporium sp. (*?H. avenae* Oud.), leaf mold. Oreg. (2).
Mastigosporium cylindricum Sprague, leaf spot. Oreg. (6).
Ophiobolus graminis Sacc., root and culm rot. Oreg. (6).
Ovularia pulchella (Ces.) Sacc., gray leaf spot. Wash. (2).
Phlyctaena bromi Clements: See *Selenophoma bromigena*.
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Wyo. (1); Ind., Mont., ?Wis. (3); Iowa, Pa. (5).
Pleospora infectoria Fckl., on dead culms. Calif. (3).
Pseudomonas coronafaciens (Elliott) F. L. Stevens var. *atropurpurea* (Reddy & Godkin) Stapp, chocolate spot. N. Dak., Oreg., Wash., Wis. (2); Oreg. (3); Wyo. (4).
Puccinia coronata Cda. (II,III), crown rust. Occasionally recorded in Colo., Mich., and N.Y. The f. sp. *bromi* Fraser & Ledingham has been identified in some collections.
P. glumarum (Schm.) Eriks. & E. Henn. (II,III), stripe rust. Mont. to Colo., Calif., and Wash. Recorded on (1,2,3,5).
P. graminis Pers. (II,III), stem rust. Infrequent but recorded in Calif., Ind., Minn., N. Dak., Oreg. on (1,2,3,5).
P. rubigo-vera (DC.) Wint. (*P. dispersa* Eriks. & E. Henn.) (II,III), leaf rust. Colo., N. Mex., Utah (1); Wis. to Tex., Calif., and Wash. (2); general (3); Colo. (4); Ind., Iowa, Minn. (5); Calif., Oreg. (6). In Arthur's terminology the var. *agropyri* (Ell. & Ev.) Arth. occurs on (2), the var. *agropyrina* (Eriks.) Arth. on (3,5). Mains refers the races on these hosts to the f. sp. *alternans* (Arth.) Mains (1,2), *bromicola* Mains (2); and *arthuri* Mains (3,5).
P. tomipara Trel. (II,III)—Mich., Wis. (1,3). Considered a form of *P. rubigo-vera* by some authorities, a distinct species by others.
Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, pink root, secondary root rot. N. Dak. (2).
Pyrenophora bromi Drechs., leaf spot. Ky., Mich., Wash. (2). According to Wehmeyer this is a physiologic form of *Pleospora trichostoma* (Fr.) Ces. & de N. (*Pyrenophora trichostoma* (Fr.) Fckl.).

Pythium arrhenomanes Drechs., root browning. N. Dak. (1,2).
Rhizoctonia solani Kuehn, root rot. N. Dak. (2). Leaf and culm rot—Oreg. (2).
Rhynchosporium secalis (Oud.) J. J. Davis, scald. Wash. (2).
Sclerotium rhizodes Auers. (*?Rhizoctonia, ?Typhula*), leaf and culm rot. Wis. (3).
Scolecotrichum graminis Fckl., brown stripe. S. Dak. to Calif. and Wash. (2); Oreg. (6).
Selenophoma bromigena (Sacc.) Sprague & A. G. Johnson, leaf spot. N. Dak., Wash., Wyo. (2); ?Colo. (3).
Septogloeum oxysporum Bomm., Rouss., & Sacc., char spot. Colo. (3).
Septoria brevispora Ell. & J. J. Davis, leaf spot, speckle. Wis. (3).
S. bromi Sacc.—Okla. (5); Oreg., Wis. (6).
S. jaculella Sprague—Idaho, Oreg., Wash. (2); Ariz. (3); Calif. (6).
Stagonospora bromi A.L.Sm. & Ramsb., brown blotch. Ky., Mich., N. Dak. (2); Wis. (3,5); Minn. (6).
Synchytrium sp., purple leaf speckle. Oreg. (2).
Tilletia caries (DC.) Tul., rough-spored bunt. Idaho, Mont. (2); Wyo. (3).
Urocystis agropyri (Preuss) Schroet., flag smut. Wash. (2); Iowa, Kans. (3).
Ustilago bullata Berk. (*U. bromivora* (Tul.) Alek. Fisch.), head smut, brome loose smut. General throughout the Western States (*), and also in grass nurseries in Iowa, Ky., Md., Mich. (1,2,3,4). Following G. W. Fischer's usage the name most applicable to the composite species occurring on many grasses is taken in preference to *U. bromivora*, which is usually but not exclusively reported on *Bromus*. Fischer's Race 5 attacks all the species of the mountain brome group; Race 7 attacks only *B. marginatus*.

BENDS (hairpin) (distortion of apical part of culm)—cause unknown. Wash. (1,2,6).

II. Introduced Cultivated Species

(1) *Bromus catharticus* Vahl, rescuegrass.
(2) *B. inermis* Leyss, smooth brome (Hungarian brome).
(3) *B. erectus* Huds., meadow brome.

Annual or biennial (1) or perennial (2,3) grasses of Europe: (1) cultivated for hay and pasture chiefly in the South; (2) cultivated widely in the North Central and Western States, also naturalized.

Alternaria tenuis Nees ex Cda., seed mold. Minn., Mont., Oreg. (2).
Ascochyta graminicola Sacc. var. *diedickeana* Baudyš & Picb., leaf spot. Ky., Minn. (2); also on roots—N. Dak. (2).
Cercospora festucae Hardison, leaf spot. Tex. (2).
Cercosporella herpotrichoides Fron, foot rot. Idaho (2).
Claviceps purpurea (Fr.) Tul., ergot. Widespread (2); Minn., Mont., N.Y. (3).
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Tex. (1), Nebr. (2).
Curvularia geniculata (Tracy & Earle) Boed., secondary root rot. S. Dak. (2).
Erysiphe graminis DC., powdery mildew. Ga., S. Dak., Tex. (1); Minn., Wash. (2,3).
Fusarium spp., secondary root rot: *F. equiseti* (Cda.) Sacc.—N. Dak., Nebr., S. Dak. (2); *F. oxysporum* Schlecht.—Nebr., N. Dak., S. Dak.; *F. poae* (Pk.) Wr.—N. Dak., S. Dak. (2); F. *scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr.—Mont., N. Dak., S. Dak. (2,3); *F. sporotrichioides* Sherb.—N. Dak. (2).
Helminthosporium sp., leaf spot. Fla., Ga. (1).
H. bromi Died.: SEE *Pyrenophora bromi*.
H. giganteum Heald & Wolf, leaf spot. Md. (2).
H. sativum Pam., King, & Bakke, root rot. Minn. to Nebr. and Mont., also Va. (2).
Ophiobolus graminis Sacc., take-all, root rot. N. Dak. (2).
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. N. Dak. (2).
Pratylenchus pratensis (De Man) Filip, root nematode. Utah (2).
Pseudomonas coronafaciens (Elliott) F. L. Stevens var. *atropurpurea* (Reddy & Godkin) Stapp, chocolate spot. Pa. to Kans. and Wash., frequent in northern Great Plains (2); Mont., Oreg., Wash. (3).
Puccinia coronata Cda. (II,III), crown rust. S. Dak. (2).
P. glumarum (Schum.) Eriks. & E. Henn. (II,III), stripe rust. Calif. (1); Idaho (3).
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Oreg., Wash. (1).
Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, pink root. N. Dak. (2).
Pyrenophora bromi Drechs., leaf spot. N.Y. to Md., Ky., and N. Dak. (2); also on roots. N. Dak. (2). See note on this name in preceding section.
Phythium spp., root browning, root necrosis: *P. aristosporum* Vanterpool—N. Dak. (2); *P. arrhenomanes* Drechs.—Minn. to Nebr. and N. Dak. (2); N .Dak. (3); *P. debaryanum* Hesse—Minn. to Nebr. and N. Dak. (2); *P. graminicola* Subr.—Minn., ?N. Dak. (2); *P. irregulare* Buis.—N. Dak. (2); *P. proliferum* d By.—Nebr. (2); *P. ultimum* Trow—Minn., N. Dak. (2).
Rhizoctonia solani Kuehn, root rot. N. Dak., S. Dak. (2).
Rhynchosporium secalis (Oud.) J. J. Davis, scald. Calif., Wash., Wis. (2).
Scolecotrichum graminis Fckl., brown stripe. N.Y., Wash. (1); Ariz., Oreg. (2).
Selenophoma bromigena (Sacc.) Sprague & A. G. Johnson, leaf spot. Wis. to Nebr. and Mont., also Ariz. and Wash. (2).
Septoria bromi Sacc., leaf blotch. Mont., N. Dak., Oreg., Wash., Wis. (2).
Stagonospora bromi A.L.Sm. & Ramsb., leaf blotch. Ky. (1,2), Wis. (2).
Ustilago bullata Berk. (*U. bromivora* (Tul.) Fisch. v. Waldh.), head smut. Northern Great Plains to Tex. and Pacific Northwest (1,2); also Ark. and N.Y. (1); Idaho, N. Dak., Wash. (3).
Xanthomonas translucens L. R. Jones, A. G. Johnson, & Reddy, leaf streak. Iowa, Kans., Nebr. (2).
MOSAIC—virus (*Marmor graminis* McK.). Kans., Nebr. (2).
BENDS (hairpin)—cause unknown. Ky., Mont., Wash., Wis. (2).

III. Annuals, Introduced Weedy Species (Chess), Rarely Cultivated

(1) *Bromus brizaeformis* Fisch. & Mey., rattlesnake chess.
(2) *B. japonicus* Thunb., Japanese chess.
(3) *B. rigidus* Roth, ripgutgrass.
(4) *B. secalinus* L. (with *B. commutatus* Schrad., *B. mollis* L., and *B. racemosus* L.), soft chess.
(5) *B. tectorum* L., downy chess (with *B. rubens* L., foxtail chess).
(6) Other species.

Old World grasses widely naturalized in the United States: (1) and a few other species

occasionally cultivated for ornament; (4) and related forms sometimes used for hay; (3) and (5) widely distributed weeds, especially in the West, of limited forage value; all useful to wildlife.

Centrospora bromi (Sprague) Newhall, leaf spot. Oreg., Wash. (3).
Cercosporella herpotrichoides Fron, foot rot. Oreg., Wash. (5).
Claviceps purpurea (Fr.) Tul., ergot. Ind., Ky. (4).
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. N.Y., Ohio, Pa., Tex. (4).
Erysiphe graminis DC., powdery mildew. Oreg., Wash. (3,4); Nebr., Wash. (5); Mont., Oreg., Wash., Wyo. (6).
Fusarium culmorum (W.G.Sm.) Sacc., root rot. Oreg., Wash. (5).
F. equiseti (Cda.) Sacc. and *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr. (*F. roseum* Lk. ex Snyd. & Hans.), secondary root rot. N. Dak., S. Dak. (2,5,6).
F. graminearum Schwabe: SEE *Gibberella zeae*.
F. nivale (Fr.) Ces., snow mold. Oreg., Wash. (3,4,5).
F. oxysporum Schlecht., secondary root rot. N. Dak. (6).
Gibberella zeae (Schw.) Petch, head blight. Mich., Wis. (4).
Helminthosporium bromi Died., leaf spot. Mont., Wyo. (2); Oreg. (3); Wash. (5).
H. sativum Pam., King, & Bakke, root rot. Calif. (2), N. Dak. (5,6).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H. (4).
Mycosphaerella sp. (*Sphaerella longissima* Fckl.), leaf spot. Alaska (4).
Ophiobolus graminis Sacc., foot rot, take-all. Ark., N.Y. (4).
Phialea temulenta Prill. & Del., blind seed. Oreg. (on *B. racemosus*).
Phoma graminella Sacc., on leaves. Miss. (4).
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Calif. (on *B. trinii*).
Phyllosticta sp., leaf spot. Ga. (4).
Pseudomonas coronafaciens (Elliott) F. L. Stevens var. *atropurpurea* (Reddy & Godkin) Stapp, chocolate spot. Oreg., Wash. (3,5).
Puccinia coronata Cda. (II,III), crown rust. Mich. (1); Ga., Oreg. (4).
P. glumarum (Schm.) Eriks. & E. Henn. (II,III), stripe rust. Wash. (4).
P. graminis Pers. (II,III), stem rust. Colo., Kans. (2); Calif. (3); Pa. and Md. to Kans. and Wis. (4); Calif., Colo., Wash. (5). The f. sp. *avenae* Eriks. & E. Henn. identified in some collections (4,5); also f. spp. *secalis* Eriks. & Henn. and *tritici* Eriks. & E. Henn., and var. *phlei-pratensis* (Eriks. & E. Henn.) Stakman & Piemeisel on (5).
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Ind. (2); Pacific Coast States (3,5); general (4).
Pythium spp., root browning, necrosis: *P. debaryanum* Hesse—N. Dak. (6); *P. irregulare* Buis.—Nebr., N. Dak. (5); *P. perniciosum* Serbinow—Wash. (5); *P. proliferum* d By.—Nebr. (5).
Rhizoctonia solani Kuehn, root rot. Minn. (5).
R. ?oryzae Ryker & Gooch, leaf and culm spot. Idaho, Wash. (5).
Rhynchosporium secalis (Oud.) J. J. Davis, scald. Calif. (4).
Sclerospora macrospora Sacc., downy mildew. Ky., Tenn., ?Oreg. (on *B. commutatus*).
Scolecotrichum graminis Fckl., brown stripe. Oreg., Wash. (4,6); Colo. (6).
Septoria bromi Sacc., leaf spot. Wash., Wyo. (2); N.C. to Okla. and Wis. (4); Pacific Northwest (4, and related species).
S. jaculella Sprague—Oreg. (3), Wash. (3,5).
Tilletia caries (DC.) Tul., rough-spored bunt. Wash. (3,5); Colo., Idaho, Mont., Utah (5).
T. guyotiana Har., covered smut. Idaho (1); Wash. (1,2,4); Idaho, Oreg. (4).
Tylenchus spiralis Cassidy, root nematode, T.H. (4).
Typhula ?idahoensis Remsberg, snow blight. Wash. (4,5). Also reported as *Sclerotium* sp.
Ustilago bullata Berk., loose smut. General in the Rocky Mountain and Pacific Coast States (2,4,5); Wash. (3); occasional eastward to N.Dak., Kans., and La. (2,4).
U. striiformis (West.) Niessl, stripe smut. N.Dak. (6).
Wojnowicia graminis (McAlp.) Sacc. & D. Sacc., secondary root rot. Oreg. (5).
BENDS (hairpin)—cause unknown. Mich. (1); Wash. (4,5).

Buchloë

B. dactyloides (Nutt.) Engelm., buffalograss. A dominant perennial and important forage grass of the shortgrass ranges from North Dakota and Montana to Texas.

Alternaria sp., glume spot. Tex.
Anguina sp., nematode gall of leaves and seeds. Kans., Okla., Tex. Reported as *Anguillulina agrostidis* Gernert.
Cercospora seminalis Ell. & Ev., leaf and glume spot, false smut. N.Dak. to Tex. and Colo.
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Nebr.
Fusarium equiseti (Cda.) Sacc., secondary root rot. N. Dak.
Helminthosporium buchloës Lefebvre & A.G.Johnson, leaf and glume spot. Kans., Nebr., Okla., Tex., Wis. Also reported as *H. inconspicuum* Cke. & Ell. var. *buchloës* Ell. & Barth.
Phyllachora boutelouae Rehm, tar spot. Ark., Kans., Tex.
Puccinia kansensis Ell. & Barth. (II,III), leaf rust. Kans., Tex. O and I unknown.
P. graminis Pers. (II,III). Natural infection recorded.
Tilletia buchloëana Kell. & Swing., kernel smut. Kans., Tex.
Ustilago buchloës Ell. & Tracy, leaf smut. Nebr., N.Mex.

Calamagrostis, bluejoint, reedgrass

(1) *C. canadensis* (Michx.) Beauv.
(2) *C. inexpansa* A.Gray, northern reedgrass.
(3) *C. montanensis* Scribn., plains reedgrass.
(4) *C. rubescens* Buckl., pinegrass.
(5) Other species.

Native perennial grasses of the northern and western United States: (1) occurs in several geographic forms, e.g., var. *scabra* (Presl.) Hitchc. and is an important source of wild hay in the North Central States; (2) of similar range and (3) and (4) in the northern Rocky Mountains and the Pacific Coast States are important forage grasses and wildlife-food plants.

Acrospermum compressum Tode ex. Fr., on dead culms. (N.Y. (1).
Amastigosporium graminicola Bond.-Mont. Oreg. (5).
Anguina sp., nematode gall. Wis. (1), associated with twist disease; N.Y. (? 1,5).
Ascochyta graminicola Sacc., on leaves. Wis. (1).
Balansia epichloë (Weese) Diehl, black ring, sterility disease. Wis. (1), N.Dak (2)

Cladosporium graminum Pers. ex Lk., leaf mold. Oreg., Wash. (4).
Claviceps microcephala (Wallr.) Tul. and *C. purpurea* (Fr.) Tul., ergot. Maine to Minn., Wash. (1); Minn., Mont., N.Dak. (2,5); Oreg., Alaska (5). Both forms, perhaps constituting only one species *(C. purpurea)*, are reported without satisfactory distinction, *C. microcephala* usually more northerly.
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Idaho, Minn., Mont., N.Dak., Ohio, Wis. (1); Minn., Mont., N.Dak. (2); Mont., Oreg. (4); Mont. (5).
Coniothyrium psammae Oud., leaf spot. Oreg. (5).
Cylindrosporium calamagrostidis Ell. & Ev., leaf spot. Wis. (1).
Dilophospora alopecuri Fr., twist. Wis. (1).
Dothichloë: SEE *Balansia.*
Epichloë typhina (Pers. ex Fr.) Tul., choke, cat-tail. Minn., Wis. (1).
Erysiphe graminis DC., powdery mildew. Ohio (1); Mont., Wash. (4).
Fusarium nivale (Fr.) Ces., snow mold. ?Minn. (1), Calif. (5).
Hadrotrichum lineare Pk., on leaves. N.Y. (1), Alaska (5).
Helminthosporium sp., leaf spot. Minn. (1).
H. sativum Pam., King, & Bakke—Va. (5).
Hendersonia calamovilfae Petr., leaf mold. S.Dak. (1).
H. simplex Schroet.—Mont. (2).
Herpotrichia graminea Dearn & House, leaf mold. N.Y. (1). *H. purpurea* Ell. & Ev.—Wash. (5).
Heterosporium avenae Oud., leaf mold. Mont. (4).
Hyalothyridium calamagrostidis Greene, Wis. (1).
Leptosphaeria culmifraga (Fr.) Ces. & de N., on dead culms. N.Y. (1), Alaska (5).
Lophodermium apiculatum (Wormsk. ex Fr.) Sacc., on culms. Colo. (1).
L. arundinaceum (Schrad. ex Fr.) Chev.—N.Mex. (2), Calif. (5).
Mastigosporium rubricosum (Dearn. & Barth.) Nannf., red eyespot. Mont., Oreg., Utah, Wash., Wis., Wyo., Alaska (1).
Mycosphaerella calamagrostidis Greene, on leaves and culms. Wis. (1), Oreg. (5).
M. tassiana (de N.) Johans., on dead culms. Colo., Oreg. (5).
M. tulasnei (Jancz.) Lindau, leaf mold. Calif. (5).
Ovularia pusilla (Ung.) Sacc. & D. Sacc., leaf spot. Mont. (1).
Phaeoseptoria calamagrostidis Sprague, on leaves. Wis. (1), Oreg. (5).
P. festucae Sprague—Wash. (4).
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Mich., Minn., Nebr., N.Y., Wis. (1); Nebr. (2); Alaska (5).
Pseudomonas coronafaciens (Elliott) F.I.Stevens, bacterial spot. S.Dak. (3).
Puccinia coronata Cda. (II,III), crown rust. General (1); Mich., N.Dak., Oreg. (2); Wyo. (4); Calif., Colo., Mont., Oreg., Utah, Wash., Wyo. (5). The f. sp *calamagrostis* Eriks. (var. *calamagrostis* Fraser & Led.) with O and I on *Rhamnus alnifolia* has been identified.
P. graminis Pers. (II,III), stem rust. Conn., Ohio, Wis. (1); Calif. (2,5). The f. sp. *avenae* has been identified.
P. pygmaea Eriks. (II,III), leaf rust. Mich., Wis. (1); Oreg. (2,5); Alaska (5). O and I on *Berberis* sp. in Europe.
Rhizoctonia solani Kuehn, root rot. S.Dak. (3).
Rhynchosporium orthosporum Caldwell, scald. S.Dak., Wyo. (1).
Sclerotium rhizodes Auers. *(?Rhizoctonia, ?Typhula)*, leaf rot. Mass., N.H., N.J., N.Y., Wis. (1)
Scolecotrichum graminis Fckl., brown stripe. Colo., N. Dak., Wash. (1).
Selenophoma everhartii (Sacc. & Syd.) Sprague & A.G. Johnson, speckle. Wis. (1); N.Dak. (3); Wash. (4); Wyo., Alaska (5).
Septogloeum oxysporum Bomm., Rouss., & Sacc., char spot. Idaho, N.Dak. (2); Idaho (4).
Septoria arctica Berk. & Curt., leaf spot. Oreg., Alaska (5).
S. avenae Frank, speckled leaf blotch. Mont. (1).
Spermospora subulata (Sprague) Sprague, leaf blast. Wash. (4), Wyo (5).
Stagonospora arenaria Sacc., leaf mold. Minn. (2).
Urocystis agropyri (Preuss) Schroet., flag smut. Oreg. (1).
Ustilago calamagrostidis (Fckl.) Clint., stripe smut. Ohio, Vt., Wis., Wyo. (1); N.Y. (5).

Calamovilfa, sandreed

(1) *C. gigantea* (Nutt.) Scribn. & Mey., big sandreed.
(2) *C. longifolia* (Hook.) Scribn., prairie sandreed.

Perennial grasses of sandy areas in the northern Plains; of minor forage value and useful in erosion control.

Cladosporium graminum Pers. ex Lk., leaf mold. N.Dak. (2).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Okla., Wis. (2).
Epichloë typhina (Pers. ex Fr.) Tul., choke.
Fusarium scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak. (2).
Helminthosporium sativum Pam., King, & Bakke, root rot. N.Dak. (2).
Hendersonia calamovilfae Petr., leaf mold. N.Dak. (1,2), Wash. (1), Wis. (2).
Physalospora leptosperma Rostr.. on culms. Colo. (2).
Puccinia amphigena Diet. (II,III), leaf rust. Colo., Mont., N.Dak., Okla. (1); Ind. and Mich. to Okla. and Mont. (2). O and I on *Leucocrinum* and *Smilax.*
P. graminis Pers. (II,III), stem rust. Mont., N.Dak., Nebr. (2).
P. sporoboli Arth. (II,III), rust. Mich. (2). O and I on *Allium* and *Lilium.*
Pyrenopeziza ellisii Rehm ex Massee, on culms. Mont. (2).
Pythium arrhenomanes Drechs., root rot. N.Dak. (2).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A. G. Johnson, leaf spot. N.Dak., S.Dak. (2).
Septoria calamovilfae Petr., leaf spot. N.Dak., S.Dak., Wyo. (2).
Stagonospora simplicior Sacc. & Briard, leaf mold. N. Dak. (2).

Catabrosa

C. aquatica (L.) Beauv., brookgrass.

Perennial of moist habitats in the northern Plains and foothills of the Rocky Mountains; useful to wildlife.

Entyloma crastophilum Sacc., leaf smut. Utah.
Erysiphe graminis DC., powdery mildew. Mont., S.Dak.
Puccinia graminis Pers. (II,III), stem rust. Nebr., Wis.
P. poae-sudeticae (West.) Jørst. (II), leaf rust. Idaho, Ind., Mont., Nebr., S.Dak., Utah, Wyo. O and I unknown, III on *Poa* spp.

Cenchrus, sandbur

(1) *C. echinatus* L., southern sandbur.
(2) *C. pauciflorus* Benth., field sandbur.
(3) *C. tribuloides* L., dune sandbur.

(4) *Cenchrus myosuroides* H.B.K., big sandbur.
(5) Other species.

Annual (1,2,3) or perennial (4) weedy grasses, typically of sandy waste ground, sometimes in cultivated fields: (1) ranging from South Carolina to California, (2) throughout the United States, (3) near the coasts from New York to Florida and Louisiana, (4) coastal lowlands from Florida to Texas and southward.

Amerosporium sp. Fla. (5).
Balansia obtecta Diehl, black ring, sterility disease. Fla. (1,5).
Cladosporium spongiosum Berk. & Curt., on burs. Fla. (5).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Del. (2).
Curvularia sp., leaf mold. Fla (5).
Ephelis mexicana Fr. apud Berk.: See *Balansia obtecta.*
Gibberella zeae (Schw.) Petch, on culms, ?foot rot. Fla. (1).
Helminthosporium sp., leaf spot. Fla. (5).
Phyllachora sphaerosperma Wint., tar spot. Calif., Fla., Miss., C.Z., P.R., V.I. (1,3,4,5).
Puccinia cenchri Diet. & Holw. (II,III), rust. Fla. to Tex. and Okla., P.R., T.H., V.I. (1,2,5). O and I unknown.
Septoria cenchrina J.J. Davis, leaf spot. N.Dak. (2); Minn., Wis. (2); Tex. (4).
Sorosporium syntherismae (Pk.) Farl., inflorescence smut. Tex. (1); general (2); Fla. (5).

Chloris

(1) *C. gayana* Kunth., Rhodes grass. Robust perennial of Africa, cultivated for forage in the Southwest, escaped and naturalized there and southward.
(2) *C. virgata* Swartz, feather-fingergrass, showy chloris. Annual of waste ground in the South Central and Southwestern States, sometimes a weed in cultivated fields; useful to wildlife.
(3) Other species.

Balansia epichloë (Weese) Diehl, black ring, sterility disease. Fla., P.R. (3). *B. henningsiana* (Moell.) Diehl—Fla. (3).
Cercospora caespitosa Ell. & Ev., leaf spot. Miss. (3).
Curvularia sp., leaf mold. Fla. (3).
Fusarium scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak. (2).
Helminthosporium sp., leaf spot. Fla. (1).
H. sativum Pam., King, & Bakke, root rot. Minn. (3).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meliola panici Earle, black mildew. P.R. (3).
Meloidogyne sp., root knot nematodes. T.H. (1).
Phyllachora boutelouae Rehm, tar spot. N.Mex. (2), Tex. (3).
Puccinia chloridis Speg. (II,III), rust. N.Y. (1); Kans., N.Mex., Okla., Tex. (3). O and I unknown.
P. glumarum (Schm.) Eriks. & Henn. (II,III), stripe rust. Wash. (3).
Pyrenochaeta graminis Ell. & Ev., leaf blight. Kans., Tex. (3).
Sclerospora farlowii Griff., downy mildew. Ariz. (2).
Tylenchus spiralis Cassidy, root nematode. T.H. (1).
Uromyces archerianus Arth. & Fromme (II,III), rust. N.Mex. (2). O and I unknown.
Ustilago chloridicola P. Henn., inflorescence smut. Calif. (3).
U. elegans Griff.—Ariz. (2).

Cinna, woodreed

(1) *C. arundinacea* L., stout woodreed.
(2) *C. latifolia* (Trevir.) Griseb., drooping woodreed.

Perennial grasses of moist woodlands; (1) in the Mississippi Valley and eastward, (2) in the Northern States from New England to the Pacific coast; both furnish sparse forage.

Acrospermum compressum Tode ex Fr., on culms. Pa. (1).
Epichloë typhina (Pers. ex Fr.) Tul., choke. Ark., Md., Va. (1).
Erysiphe graminis DC., powdery mildew. Iowa. (1).
Helminthosporium catenarium Drechsl., leaf blight. N.Y. (1). *H. turcicum* Pass., on leaves. Ala. (1).
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Ill., Kans., Md., Va., Wis. (1).
Pleospora sp., on leaves. Wis. (2).
Puccinia coronata Cda. (II,III), crown rust. Ind., Iowa, N.Y., Wis. (1); Idaho, Mich., Mont., Wash. (2).
P. glumarum (Schm.) Eriks. & Henn., stripe rust. Idaho.
P. graminis Pers. (II,III), stem rust. Conn., Ind., Mich., Mo., N.Y., Nebr., Ohio, Va., Wis. (1); Conn., N.Y., Wis. (2). The var. *phlei-pratensis* (Eriks. & Henn.) Stakman & Piemeisel reported in Wis.
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Md., Mo., N.Y., Wis. (1); N.H., Wis. (2). The var. *impatientis* (Arth.) Mains, with O and I on *Impatiens* spp. has been identified.
Scolecotrichum graminis Fckl., brown stripe. Wis. (2).
Stagonospora arenaria Sacc., leaf blotch. Minn., Oreg. (2). *S. intermixta* (Cke.) Sacc.—Wis. (1,2).

Coix

C. lachryma-jobi, jobs-tears.

Annual of tropical Asia, cultivated for ornament and widely escaped and established on waste ground in the South and tropical America.

Phyllosticta sp., leaf spot. T.H.
Ustilago coicis Bref., head smut. Has been intercepted on imported seed and developed on plants grown from such seed; no report of establishment in the U.S.

Cortaderia

C. selloana (Schult.) Aschers. & Graebn., pampasgrass.

Perennial of South America, grown for ornament in the South and California; the plumes are occasionally sold in the florist's trade.

Apiospora montagnei Sacc., on dead leaves. S.C.
Chaetostroma aterrima (Cke.) Sacc., on leaves. S.C.
Coniosporium arundinis (Cda.) Sacc.: See *Papularia arundinis.*
Fusarium graminearum Schwabe, on leaf sheaths. Calif.
Helminthosporium sp., leaf spot. Ga. *H. parvulum* Cke., on leaves. S.C.
Hendersonia culmiseda Sacc., leaf mold. Oreg.
Mystrosporium consors Thuem., on dead leaves. S.C.
Papularia arundinis (Cda.) Fr., on culms. Calif.
Phoma gyneriicolum Cke. & Mass., on leaves. Calif. *P.*

lineata Sacc. *(Coniothyrium lineare* Thuem.), on culms. Calif.
Phyllosticta sp., leaf spot. Ky.

Cymbopogon

(1) *C. citratus* (DC.) Stapf, lemongrass.
(2) *C. nardus* (L.) Rendle, citronellagrass.

Perennial grasses of tropical Asia, grown in the South for aromatic foliage, naturalized in tropical America.

Helminthosporium sacchari (B. de Haan) Butler, eyespot. Fla.
Himantia stellifera Johnston (*?Odontia saccharicola* Burt), web blight, sheath rot. P.R.
Myriogenospora paspali Atk. (*M. atramentosa* (Berk. & Curt.) Diehl?), tangle-top. Fla.
Papularia vinosa (Berk. & Curt.) Mason, on leaves. P.R.

Cynodon

C. dactylon (L.) Pers., Bermuda grass.

Perennial of Eurasian origin, now cosmopolitan in warm-temperate regions; an important pasture and lawn grass in the South, also grown in the North, as in Michigan, New England, and Oregon, but not hardy; sometimes a troublesome weed in moist fields.

Apiospora montagnei Sacc., on dead leaves. Ga.
Cercospora seminalis Ell. & Ev., leaf and glume spot. Tex.
Coniosporium gramineum (Ell. & Ev.) Sacc., *C. rhizophilum* (Preuss) Sacc.: SEE *Papularia.*
Corticium sasakii (Shirai) T. Matsu (*Rhizoctonia grisea* (Stevenson) Matz), banded sclerotial disease. Ala., La., Miss. Belongs in *Pellicularia* according to Rogers' concept but has not been placed there.
Dimerosporium erysipheoides Ell. & Ev., on dead leaves. La. This name retained here although *Dimerosporium=Asterina* in modern usage; this species is not an *Asterina.*
Diplodina graminea Sacc., on culms. S.C.
Erysiphe graminis DC., powdery mildew. Calif.
Fusarium nivale (Fr.) Ces., snow mold. Wash.
Helminthosporium sp., leaf blight. Calif., Fla., Ga., Okla., Tex. *H. cynodontis* Marig., on leaves. ?leaf blight. Fla., Ga., N.C., Va. *H. giganteum* Heald & Wolf, zonate eyespot. Fla., Md., N.C., Tex.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophoma sp., on culms. S.C.
Meloidogyne sp., root knot nematodes. Calif., Ga., T.H.
Papularia arundinis (Fr.) Cda., on culms and stolons. La., Miss.
Phymatotrichum omnivorum (Shear) Dug., on roots. Ariz. Hyphal strands are sometimes found on roots of this plant but there is apparently no parasitic relationship.
Physarum cinereum (Batsch.) Pers., slime mold, on leaves and inflorescences. Fla., Okla., Tex. Nonparasitic but sometimes injuring the host by smothering.
Pratylenchus pratensis (De Man) Filip., root nematode. Calif., T.H.
Puccinia cynodontis Lacroix ex Desm. (II,III), rust. Gulf States to Calif., C.Z., P.R. O and I on *Plantago* spp. in Europe and Japan, not yet found in U.S.
P. graminis Pers., stem rust. Natural infection recorded in Plant Dis. Rptr. Sup. 130.
Pythium sp., rootlet necrosis. Okla.
Rhizoctonia sp. (*?R. grisea* (Stevenson) Matz=*Corticium sasakii*), root and stem rot. Ariz., Okla., Tex.
R. solani Kuehn, brown patch. La., Okla., Tex., T.H.
Sclerospora farlowii Griff., downy mildew. Okla.
Sclerotium portoricense F. L. Stevens, on culms and leaves. P.R.
S. rolfsii Sacc., southern blight. Fla.
Septoria cynodontis Fckl., leaf spot. Tex.
Sorosporium syntherismae (Pk.) Farl., inflorescence smut. Calif., Tex.
Ustilago cynodontis P. Henn., inflorescence smut. Ariz., Calif., Mo., Okla., Tex.

Cynosurus

(1) *C. cristatus* L., crested dogtail.
(2) *C. echinatus* L.

Perennial (1) or annual (2) of Europe: (1) sometimes grown for forage and locally established in Northeastern States and Pacific Northwest; (2) locally established in California and Oregon.

Phialea temulenta Prill. & Del., blind seed disease. Oreg. (1).
Scolecotrichum graminis Fckl., brown stripe. N.Y. (2).

Dactylis

D. glomerata L., orchardgrass.

Coarse perennial grass of Europe and Asia, cultivated for pasture, hay, and ground cover; widely naturalized in North America; useful to wildlife. A variegated form is grown for ornament.

Ascochyta graminicola Sacc., leaf spot. Del., Pa., Vt.
Claviceps purpurea (Fr.) Tul. (including *C. microcephala* (Fr.) Tul.), ergot. Maine to Va., Okla., and Wash.
Colletotrichum graminicola (Ces.) G. W. Wils., anthracnose. Pa. to N.C., Okla., and Minn.
Corynebacterium rathayi (E.F.Sm.) Dows., bacterial head blight. Oreg.
Epichloë typhina (Pers. ex Fr.) Tul., choke. N.J.
Erysiphe graminis DC., powdery mildew. Mass. to Mo., Oreg., and Wash.
Fusarium avenaceum (Fr.) Sacc., canker, foot rot. Oreg.
F. culmorum (W.G.Sm.) Sacc., head mold. W.Va.
F. poae (Pk.) Wr. (=*F. tricinctum* (Cda.) Sacc.?), silvertop. N.Y., Pa.
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak.
Helminthosporium sp., leaf spot. Md., Mass., Minn., Pa., Wash.
H. sativum Pam., King, & Bakke, root rot. N.Dak.
H. triseptatum Drechs., leaf mold. N.Y.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Leptosphaeria culmorum Auers., on dead culms. Calif., N.Y.
Mastigosporium rubricosum (Dearn. & Barth.) Sprague, eyespot. Oreg., Wash.
Meloidogyne sp., root knot nematodes. Fla.
Phyllosticta owensii Sprague, leaf mold. Oreg.
Puccinia coronata Cda. (II,III), crown rust. Iowa, Tenn., Wis.
P. graminis Pers. (II,III), stem rust. General. The f. spp. *avenae* Eriks. & E. Henn., and *tritici* Eriks. & E. Henn., and var. *phlei-pratensis* (Eriks. & E. Henn.) Stakman & Piemeisel have been identified.
P. rubigo-vera (DC.) Wint., leaf rust. Mont.
Pythium aristosporum Vanterpool, root browning. Mont.
P. graminicola Subr.—Wash.

Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, pink root. N.Dak.
Rhynchosporium orthosporum Caldwell, scald. Idaho, Oreg., Pa., Utah, Wis. *R. secalis* (Oud.) J. J. Davis has also been reported in Calif., Mont., Oreg., and Wis., perhaps confused with the preceding.
Scolecotrichum graminis Fckl., brown stripe. General.
Selenophoma donacis (Pass.) Sprague & A.G.Johnson, var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, stem speckle. Idaho, Oreg., Wash.
Septoria sp., leaf spot. Reported as *S. graminum* Desm., but doubtful.
Stagonospora arenaria Sacc., leaf blotch. Iowa, Ky., Mich., Ohio, Oreg., Wash.
S. maculata Grove (*S. subseriata* (Desm.) Sacc. var. *maculata* Grove), leaf spot. Md., N.H., Pa., Vt.
Synchytrium sp., leaf speckle. Oreg.
Typhula itoana Imai, snow mold. Conn., Idaho, N.Y. *T. phacorrhiza* Reichardt ex Fr.—Pa.
Uromyces dactylidis Otth (II,III), leaf rust. Mass. to N.C. and Ky. O and I on *Ranunculus repens* L.
Ustilago striiformis (West.) Niessl, stripe smut. Mass. to Va. and Ky.; Oreg., Utah, Wash. A f. sp. *clintoniana* W.H.Davis is said to be restricted to this host.
Wojnowicia graminis (McAlp.) Sacc. & D. Sacc., secondary root rot, leaf mold. N.Dak., Wyo.
BENDS (hairpin)—cause unknown. Colo., Ky., Mont., Utah, Wash.
MYCELIA STERILIA—undetermined white basidiomycetous growth at base of plant, associated with leaf necrosis. Utah.

Dactyloctenium

D. aegyptium (L.) Richt., crowfootgrass.

Annual grass of Old World tropics, naturalized in the Southern States and tropical America, sometimes a weed in cultivated ground; useful to wildlife.

Cercospora tesselata Atk., leaf spot. Ala.
Ustilago sparsa Underw., head smut. Ala., La., S.C.

Danthonia, oatgrass

(1) *D. californica* Boland. (including var. *americana* (Scribn.) Hitchc.), California oatgrass.
(2) *D. compressa* Austin, flatstem oatgrass.
(3) *D. spicata* (L). Beauv., poverty oatgrass.
(4) Other species.

Perennial grasses, occurring in open woods and meadows and often indicators of poor soil: (1) in the Far West, of minor forage value; (2) in the Northeast; and (3) throughout the Eastern and Northern States; useful to wildlife.

Anguina sp., leaf and inflorescence gall. Calif., Tex.
Atkinsonella hypoxylon (Pk.) Diehl (*Balansia hypoxylon* (Pk.) Atk.), black band, sterility disease. N.C., Ohio, Tenn., Va., W.Va. (2); Maine to Ga., Tenn., and Ohio (3); Ga., Mass. (4).
Claviceps purpurea (Fr.) Tul., ergot. Mich. (3), Colo. (4).
Colletotrichum graminicola (Ces.) Wils., anthracnose. Idaho, Wash. (1).
Ephelis borealis Ell. & Ev.: SEE *Atkinsonella hypoxylon.*
Epichloë typhina (Pers. ex Fr.) Tul., choke. Va. (3).
Helminthosporium sp., leaf spot. N.Y. (3). *H. cyclops* Drechs.—Oreg. (1); Maine, Mass. (3).
Heterosporium avenae Oud., leaf mold. Calif. (4).
Lophodermium arundinaceum (Schrad. ex Fr.) Chev., on leaves and sheaths. Calif., N.Mex. (4). *L. danthoniae* Tehon—Ill., Wis. (3).
Ophiobolus stictisporus (Cke. & Ell.) Sacc. Ga. (4).
Phaeoseptoria festucae Sprague, on leaves. Colo., Oreg. (4).
Phialea temulenta Prill. & Del., blind seed disease. Oreg. (1).
Phyllachora graminis (Pers. ex Fr.) Tul., tar spot. Maine (4).
Pleospora sp., leaf rot. Oreg. (4). *P. infectoria* Fckl.—N.Mex. (4).
Puccinia graminis Pers. (II,III), stem rust. W.Va. (3).
Rhynchosporium secalis (Oud.) J.J.Davis, scald. Oreg. (3).
Scolecotrichum graminis Fckl., brown stripe. Calif., Oreg. (1).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, leaf spot. Oreg. (1).
Stagonospora subseriata (Desm.) Sacc., leaf mold. Colo. (4).
Ustilago residua Clint., panicle smut. General (*).
BENDS (hairpin)—cause unknown. Idaho (1), Wash. (4).

Deschampsia, hairgrass

(1) *D. atropurpurea* (Wahl.) Scheele, mountain hairgrass.
(2) *D. caespitosa* (L.) Beauv., tufted hairgrass.
(3) *D. danthonioides* (Trin.) Munro, annual hairgrass.
(4) Other species.

Perennial (1,2,4) or annual (3) grasses: (2) in moist meadows ranging from the Northeastern States to the Pacific coast and Alaska, a valuable forage grass; (1) of similar range at higher altitudes; (3) and (4) chiefly in the Far West.

Ascochyta graminicola Sacc., leaf spot. Oreg. (4).
Claviceps purpurea (Fr.) Tul., ergot. Oreg. (2).
Dilophospora alopecuri (Fr.) Fr., twist. Oreg. (2).
Erysiphe graminis DC., powdery mildew. Oreg. (3).
Hendersonia sp., leaf mold. Oreg. (2). *H. culmicola* Sacc. var. *minor* Sacc.—Oreg. (2).
Ophiobolus graminis Sacc., root rot. Idaho (3).
Phaeoseptoria airae (Grove) Sprague, leaf mold. Oreg. (2).
Pseudomonas coronafaciens (Elliott) F.L.Stevens, bacterial spot. Oreg. (2).
Puccinia coronata Cda. (II,III), crown rust. Oreg., Wash., Wyo. (2).
P. graminis Pers. (II,III), stem rust. Wash. (*); Mich. (2); Calif. (3,4); Idaho, Oreg. (4). Probably the f. sp. *avenae* Eriks. & E.Henn.
P. poae-sudeticae (West.) Jørst. var. *airae* (Lagh.) Arth. (*P. deschampsiae* Arth.) (II,III), leaf rust. Colo. (2), Wash. (4). O and I unknown.
Rhizoctonia solani Kuehn, root rot. Wash. (1).
Scolecotrichum graminis Fckl., brown stripe. Wash. (1); Oreg., Wash. (2,3,4); Idaho (3,4); Mont. (4).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, leaf spot. Idaho (3); Wash. (4).
S. everhartii (Sacc. & Syd.) Sprague & A.G.Johnson, on leaves and culms, speckle. Mont., Wyo. (1,2); Wash. (1,3,4).
Septoria nodorum Berk., leaf spot. Wash. (1,4). *S. poliomela* Syd., tan leaf spot. Oreg., Wash. (2,3).

Spermospora subulata (Sprague) Sprague, leaf blast. Idaho, Mont., Wyo. (2).
Stagonospora graminum Sacc. & Scalia, on leaves. Alaska (1). *S. subseriata* Sacc.—Oreg. (2); Colo. (4). *S. vexatula* Sacc.—Idaho (2).
Tilletia cerebrina Ell. & Ev., bunt. Wash., Wyo. (2); Calif., Oreg., Wash. (3); Idaho, Oreg. (4).
Typhula idahoensis Remsberg, snow mold. Idaho (4).
Uromyces jacksonii Arth. & Fromme (II,III), leaf rust. Calif., Wash. (2,3); Oreg. (3); Idaho, Mich., Oreg., Wash. (4).

Digitaria, crabgrass, fingergrass

(1) *D. ischaemum* (Schreb.) Muhl., smooth crabgrass.
(2) *D. sanguinalis* (L.) Scop., hairy crabgrass.
(3) *D. serotina* (Walt.) Michx., blanket crabgrass.
(4) *D. violascens* Link, purple crabgrass.
(5) Other species.

Mostly annual (1,2) or sometimes perennial (3,4) weedy grasses, in cultivated ground and old fields: (1) and (2) ranging nearly throughout the United States at low and medium altitudes, more common in the East and South; (3) and (4) in the Far South and tropical America. All of minor forage value and useful to wildlife.

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Md., Mich., N.Dak., Okla. (2).
Curvularia geniculata (Tracy & Earle) Boed., leaf mold. N.Dak. (2). *C. trifolii* (Kauff.) Boed.—N. Dak. (2). *Curvularia* sp.—Fla. (5).
Cuscuta arvensis Beyrich, dodder. Md. (2).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (2).
Erysiphe graminis DC., powdery mildew. Tex. (2).
Fusarium heterosporum Nees, head mold. Tex. (5).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak. (2).
Helminthosporium sp., leaf spot. Minn., Mass. (2). *H. leucostylum* Drechs.—S.C. (2). *H. sativum* Pam., King, & Bakke—N.Dak. (2).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Himantia stellifera Johnston, sheath rot. P.R. (5).
Meloidogyne sp., root knot nematodes. Md. (1); Ga., N.C., N.Y. (2); T.H. (2,5).
Mycosphaerella maydis (Pass.) Lindau, leaf spot. P.R. (2).
Phyllachora ?graminis (Pers. ex Fr.) Tul., tar spot. N.C. (2). *P. paspalicola* P.Henn.—P.R. (5).
Phyllosticta sp., leaf spot. Ky. (4). *P. rogleri* Sprague—Iowa (2).
Piricularia grisea (Cke.) Sacc., leaf spot, blast. General (1,2), Fla. (3), P.R. (5). Also reported as *P. oryzae* Cav., which is perhaps only physiologically distinct.
Pratylenchus pratensis (De Man) Filip., root nematode. Ga., T.H. (2).
Puccinia oahuensis Ell. & Ev. (II,III), rust. Fla., Ga., Tex., C.Z., P.R. (2); Fla. (3); T.H. (4). Previously reported as *P. substriata* Ell. & Barth., *P. paspalicola* (P.Henn.) Arth., or *P. tubulosa* (Pat. & Gaill.) Arth.
Rhizoctonia solani Kuehn, brown patch. Ohio (2).
Scolecotrichum graminis Fckl., brown stripe. Va. (2).
Septoria sp. (? *S. graminum* Desm.), leaf spot. Ala., N.J. (2). *S. digitarivora* Sprague—W.Va. (2).
Sphacelotheca diplospora (Ell. & Ev.) Clint., head smut. Ill., Iowa, Miss. (2).
Tilletia pulcherrima Ell. & Gall., covered smut. Miss. (2).
Ustilago rabenhorstiana Kuehn, loose smut. General (1,2); Mo., N.J. (5).
Mosaic—virus (*Marmor sacchari* Holmes, Saccharum virus 1 K.M.Sm.). Fla., Ga., La. (2); T.H. (2,5).

Distichlis, saltgrass

(1) *D. spicata* (L.) Greene, seaside saltgrass.
(2) *D. stricta* (Torr.) Rydb., inland saltgrass.

Perennial grasses: (1) on seacoasts, especially the Atlantic and Gulf coasts from Maine to Florida and Louisiana, occasional on the Pacific coast; useful to wildlife; (2) on arid plains in the Western States, of minor forage value.

Cerebella spartinae Ell. & Ev., on heads probably following ergot. Miss. (1).
Claviceps purpurea (Fr.) Tul., ergot. Miss., Wash. (1).
Endodothella tracyi (Ell. & Ev.) Th. & Syd. (*Phyllachora tracyi* Ell. & Ev.), tar spot. Oreg. (1); N.Dak., Okla. (2).
Euryachora aristidae (Schw.) Th. & Syd., char spot. Calif., Oreg. (1); N.Dak., Nev., Oreg., S.Dak., Tex., Utah, Wash. (2).
Fusarium heterosporum Nees, head mold, perhaps following ergot. Wash. (1).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak. (2).
Helminthosporium halodes Drechs., leaf blotch. N.Y. (1).
Phyllachora diplocarpa Ell. & Ev., tar spot. Calif., Colo., Kans., N.Mex., S.Dak., Tex. (1); Calif., N. Dak., Tex. (2) The reported range may be questionable because of doubtful and sometimes conflicting host identifications. *P. pammelii* Orton—Colo. (2).
Physalospora cynodontis Del., on culms. Calif., Miss. (1).
Pratylenchus pratensis (De Man) Filip., root nematode. Oreg. (1).
Puccinia aristidae Tracy (II,III), leaf rust. Maine, Del., N.C., Tex., Pacific coast (1); N.Dak. to Tex., Calif., and Wash. (2). O and I on numerous genera of dicotyledons. *P. graminis* Pers. (II,III), stem rust. Mont. (2).
Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, pink root. N.Dak. *?P. graminis* Ell. & Ev.
Tracyella spartinae (Pk.) Tassi, on culms. Tex. (2).
Uromyces peckianus Farl. (II,III), leaf rust. Calif., Conn., Mass., N.Y., Wash. (1). Resembles *Puccinia aristidae* and has a similar wide range of aecial hosts.
Ustilago halophila Speg., stem smut. Ariz., Calif., Idaho, Nev., N.Mex. (1); Oreg., Utah, Wash. (2). Formerly reported as *U. hypodytes* (Schlecht.) Fr., now distinguished in the Western States as *U. halophila* on these hosts. Connecticut report of the former awaits confirmation.
Wojnowicia graminis (McAlp.) Sacc. & D. Sacc., secondary root rot. N.Dak. (2).
Bends (hairpin)—cause unknown. Wash. (2).

Echinochloa

(1) *E. colonum* (L.) Link, jungle-rice.
(2) *E. crus-galli* (L.) Beauv., barnyard grass; including var. *frumentacea* (Roxb.) Wight, Japanese millet.

(3) *Echinochloa walteri* (Pursh) Heller, salt-marsh cockspur.

Coarse annual grasses: (1) of Old World and American tropics, adventive in the Southeastern States and southern California; (2) cosmopolitan, occurring in moist habitats throughout the United States; (3) in salt marshes or shallow ponds, mostly near the Atlantic and Gulf coasts. Sometimes used for forage, and (2) occasionally for hay or feed, especially the var. *frumentacea,* but a weed in cultivated ground; useful to wildlife.

Alternaria spp., associated with weevil (*Anacentrinus deplanatus* Casey) injury and with other fungi, causing a basal culm rot. Minn., N.Dak., S.Dak. (2).

Brachysporium: SEE *Curvularia* and *Helminthosporium.*

Cercospora echinochloae J.J.Davis, leaf spot. N.Dak., Wis. (2). *C. fusimaculans* Atk.—Iowa, Wis. (2). ?*C. sorghi* Ell. & Ev.—N.Dak. (2).

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Eastern and Central States to Ga. and Tex. (2).

Corticium microsclerotia (Matz) Weber, web blight. Fla., P.R. (1). A nomen nudum, considered by some a synonym of *Pellicularia filamentosa* (Pat.) Rogers.

Curvularia trifolii (Kauff.) Boed., root and culm rot (?secondary), seed mold. N.Dak. (2). *C. geniculata* (Tracy & Earle) Boed. also has been reported in this connection. Reports of *Brachysporium* sp. (?*B. flexuosum* (Cda.) Sacc.) may belong here.

Fusarium avenaceum (Fr.) Sacc., head mold. Wis. (2).

F. culmorum (W.G.Sm.) Sacc., foot rot. Minn., N.Dak. (2). Other species reported on (2) and associated with root and culm rot in the Northern Great Plains: *F. equiseti* (Cda.) Sacc., *F. graminearum* Schwabe, *F. scirpi* var. *acuminatum* (Ell. & Ev.) Wr. (=*F. roseum* Lk. ex Snyd. & Hans.) and *F. oxysporum* Schlecht.

Helminthosporium flexuosum Cda., basal culm rot. Minn., N.Dak. SEE ALSO *Curvularia.*

H. monoceras Drechs., leaf spot. N.Y., Tex. (2).

H. sativum Pam., King, & Bakke—Minn., N.Dak.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Leptosphaeria occidentalis Ell. & Ev., on dead culms. Kans. (2).

Meloidogyne sp., root knot nematodes. Calif. (1), Ark. (2).

Mycosphaerella crus-galli (Ell. & Kell.) Lindau, on leaves. Kans. (2).

Physoderma sp., brown stripe. Ark. (2).

Phytophthora ?cactorum (Leb. & Cohn) Schroet., root rot. S.Dak. (2).

Piricularia grisea (Cke.) Sacc., leaf spot. Okla., Tex. (1); Wis. (2).

Pratylenchus pratensis (De Man) Filip., root nematode. Calif. (1).

Pseudomonas tabaci (Wolf & Foster) Stapp, bacterial leaf spot. Wis. (2).

Puccinia flaccida Berk. & Br. (II,III), leaf rust. Wis. to Ill., N.Mex., and Nebr. (2). O and I unknown.

P. graminis Pers. (II,III), stem rust. Iowa (2).

Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, pink root. N.Dak. (2).

Pythium spp., root browning and necrosis: *P. aristosporum* Vanterpool—Mont. (2); *P. arrhenomanes* Drechs., and *P. debaryanum* Hesse—N.Dak. (2); *P. tardicrescens* Vanterpool—Minn. (2).

Rhizoctonia solani Kuehn, root and culm rot (secondary). Minn., N.Dak. (2).

Sclerotium hydrophyllum Sacc., on culms. Ark. (1,2).

S. oryzae Catt. (=*Leptosphaeria salvinii* Catt.), culm rot. Ark. (1,2).

Sphacelotheca diplospora (Ell. & Ev.) Clint., covered smut. Ill., Tex. (2).

Tolyposporium bullatum Schroet., seed or covered smut. Mass. to N.C., Nebr., and S.Dak.; Calif. (2); also on var. *frumentacea* in Conn.; Ind., Md. (3).

Ustilago crus-galli Tracy & Earle, node smut. General, more frequent north and west, (2); also on var. *frumentacea* in Conn.; Del. (3).

U. sphaerogena Burr., loose smut. La., Tex. (1); Pa. to Fla., Colo., and Wis., also Calif. (2); Del., Ind., N.Y. (3).

DWARF—suspected virus. Tex. (2).

MOSAIC—unidentified virus (? *Marmor sacchari* Holmes, Saccharum virus 1 K.M.Sm.). T.H. (1,2); P.R. (1).

Eleusine

(1) *E. indica* (L.) Gaertn., goosegrass.
(2) *E. coracana* (L.) Gaertn., African millet, ragi.

Coarse annual grasses of tropical Africa: (1) established in tropical America and throughout the Southern States to southern New England and Iowa; a troublesome weed in the South; (2) the seed of this cultivated form is sometimes used for feed; useful to wildlife.

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Fla. (1).

Corticium microsclerotia (Matz) Weber, web blight. Fla., P.R. (1). See note under *Echinochloa.*

Helminthosporium cynodontis Marig., leaf spot. Fla. (1). *H. giganteum* Heald & Wolf, zonate eyespot. Fla., Md. (1). *H. leucostylum* Drechs., leaf spot. Ala., Kans., Ky., La.. Md., Wis. (1). *H. nodulosum* (Berk. & Curt.) Sacc., on inflorescences. Miss., S.C. (1). *H. stenacrum* Drechs., on old leaves. Md. (1).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Fla. (1,2). T.H. (1).

Pratylenchus pratensis (De Man) Filip., in roots. T.H.

Rotylenchus reniformis Linford & Oliveira, root nematode. T.H. (1).

MOSAIC—virus (*Marmor sacchari* Holmes, Saccharum virus 1 K.M.Sm.). P.R., T.H. (1).

Elymus, wildrye

I. Native Species

(1) *Elymus canadensis* L., Canada wildrye.
(2) *E. condensatus* Presl, giant wildrye.
(3) *E. glaucus* Buckl., blue wildrye.
(4) *E. mollis* Trin., American dunegrass.
(5) *E. triticoides* Buckl., creeping wildrye.
(6) *E. virginicus* L., southern wildrye.
(7) Other species.

Perennial grasses of plains or sometimes open woods: (1) and (6) ranging nearly throughout the United States—(1) more frequent in the North and East and (6) in the East and South; (2), (3), and (5) in the Rocky Mountain and Pacific Coast States, or (except 5) occasionally in the North Central

States; (4) on the north Pacific and north Atlantic seacoasts.

Anguina sp., floret and seed gall. ?Oreg., ?Alaska (3).
Apiospora montagnei Sacc., on dead culms. Ga. (6).
Ascochyta agropyrina (Fairm.) Trott., leaf spot. N. Dak. (1,6,7). *A. elymi* Tehon & Daniels—N.Dak. (1), Ill. (6), Mont. (7). *A. graminicola* Sacc.—Wash. (2); Tex. (6); Mont., N.Dak. (7). *A. sorghi* Sacc.—Idaho (3).
Cladosporium graminum Pers. ex Lk., leaf mold. Iowa, N.Dak., Oreg. (1,2,3,5,6,7). See note under *Avena*.
Claviceps purpurea (Fr.) Tul., ergot. General (*).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Wis. (1), Miss. (6).
Curvularia geniculata (Tracy & Earle) Boed., secondary root rot. N.Dak. (7).
Dilophospora alopecuri (Fr.) Fr., twist. Wyo. (3), Nev. (5).
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail, choke. Minn., N.Dak., Okla., S.Dak., Wash., Wyo. (1,6,7).
Erysiphe graminis DC., powdery mildew. Occasional throughout the northern and western parts of the host ranges (Pa. to Calif. and Wash.) (1,2,3,5,6,7).
Euryachora aristidae (Schw.) Th. & Syd., char spot. Mont., Wyo. (2).
Fusarium culmorum (W.G.Sm.) Sacc., root rot, head mold. Idaho (2). *F. heterosporum* Nees, head mold. Mo. (6). *F. nivale* (Fr.) Ces., pink snow mold. Wash. (1,3). *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak (3,5,7). *F. sporotrichioides* Sherb.—S.Dak. (7).
Gloeosporium bolleyi Sprague, seedling root rot. N.Dak. (1); probably general in the northern Plains.
Helminthosporium sp., leaf spot, leaf mold. Minn. (1), Mich. (2).
H. giganteum Heald & Wolf, zonate eyespot. Md., Pa., Wash. (6).
H. sativum Pam., King, & Bakke, root rot. Minn., N. Dak., S.Dak. (1,3,6,7).
H. tritici-repentis Died., leaf spot. Wash. (3), Oreg. (7).
Hendersonia sp., leaf mold. Oreg. (3). *H. agropyri-repentis* Oud.—Wash. (3); *H. culmicola* Sacc.—Pa., Tex. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Heterosporium avenae Oud., leaf mold. Oreg., Wash., Wyo. (2).
Leptosphaeria culmifraga (Fr.) Ces. & de N., on dead culms. N.Mex. (1), Calif. (3), N.Dak. (6). *L. elymi* Atk.—N.Dak. (1), Ala. (6). *L. spectabilis* Niessl—Tex. (7).
Lophodermium arundinaceum (Schrad. ex Fr.) Chev., on culms. Alaska (4).
Macrophoma phlei Tehon & Stout, on leaves. N.Dak. (5).
Meloidogyne sp., root knot nematodes. Wash. (4).
Mycosphaerella sp. (?*M. tulasnei* (Jancz.) Lindau), on leaves. N.Dak., Wash. (2,5). See also *Cladosporium graminum*.
Ophiobolus graminis Sacc., take-all. Idaho (3).
Phaeoseptoria elymi Sprague, leaf spot. Nebr. (6). *P. festucae* Sprague var. *muhlenbergiae* Sprague—Wis. (6).
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. General (1,6); Calif. (2,3,5); Mont., N.Y. (3); N.Y., Pa., W.Va. (7). *P. serialis* Ell. & Ev.—Calif. (5)
Phyllactinia corylea Pers. ex Karst., powdery mildew. Oreg. (3). Presence on other than arborescent hosts usually considered accidental, in this case reported actually attached.
Phyllosticta sp., leaf spot. Oreg. (2).
Pseudomonas coronafaciens (Elliott) F.L.Stevens var. *atropurpurea* (Reddy & Godkin) Stapp, chocolate spot. N.Dak. and S.Dak. to Utah, Idaho, and Pacific Coast States (1,2,3,5,6,7); Ariz., Nev. (5).
Puccinia coronata Cda. (II,III), crown rust. Mich. (1, 5,6), S.Dak. (7), Wis. (1).
P. glumarum (Schm.) Eriks. & E.Henn. (II,III), yellow stripe rust. Mont. and Wyo. to Calif. and Wash. (1,2,3,6,7).
P. graminis Pers. (II,III), stem rust. General in the north-central and western parts of the respective host ranges, from Ind. and Mich. to Calif. and Wash., especially (1,2,3), occasional (5,6,7); N.Y. (7); Tex. (1,7). The f. sp. *tritici* has been identified on (1,2,3,5, and 6); f. sp. *secalis* on (1,3, and 6); var. *phlei-pratensis* on (6).
P. montanensis Ell. (II,III), brown stripe rust. Mich. to Ky., Ariz., Calif., and Wash. (1 especially; 3, 5,6,7). O and I on *Berberis fendleri*.
P. pattersoniana Arth. (II,III), leaf rust. Utah (2,5), N.Mex. (5). O and I on *Brodiaea douglasii*.
P. procera Diet. & Holw. (II,III), leaf rust. Calif. (2,4); Oreg., Wash., Wyo. (2). O and I on *Ellisia* and *Phacelia*. Mains designates this as f. sp. of *P. rubigo-vera*.
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. General (*). Var. *agropyri* (Eriks.) Arth. with O and I on Ranunculaceae reported on (1,2,3.4,5.6); var. *apocrypta* (Ell. & Tracy) Arth. with O and I on Boraginaceae and Hydrophyllaceae on (1 and 6); var. *impatientis* (Arth.) Mains with O and I on Balsaminaceae on (1 and 6). Mains has proposed various other names for the aecial host groups.
Pyrenochaeta elymi Sprague, on dead leaf tips. Utah (1).
P. terrestris (Hans.) Gorenz, J.C.Walker, & Larson (?*P. graminis* Ell. & Ev.), pink root, secondary root rot. N.Dak., Nebr., S.Dak. (*).
Pythium arrhenomanes Drechs., root browning. N.Dak. (3,7). *P. debaryanum* Hesse, root necrosis. N.Dak. (7). *P. graminicola* Subr.—Wash. (1). *P. irregulare* Buis.—N.Dak. (7).
Rhizoctonia solani Kuehn, secondary root rot. Idaho, Nebr. (1); N.Dak. (1,7). Sheath rot.—Oreg. (3).
Rhynchosporium orthosporum Caldwell, scald. Oreg. (3). *R. secalis* (Oud.) J.J.Davis—Idaho, Oreg. (2,3); Wyo. (3); Wash. (1,2,3,5,7); S.Dak. (7).
Scolecotrichum graminis Fckl., brown stripe. Cosmopolitan (*).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson, stem speckle. Calif., Mont., N.Dak., Oreg. (2); Wash. (2,7); Wyo. (3). Var. *stomaticola* (Baeumler) Sprague & A.G.Johnson—Nev. (2); N.Dak. (1,6.7); Oreg., Wash. (3,7).
S. obtusa Sprague & A.G.Johnson—Wash. (2,3); Calif., Oreg. (3).
Septogloeum oxysporum Bomm., Rouss. & Sacc., char spot. Calif., Idaho, Mont., Oreg., Wash., Wyo. (2); Idaho, Utah, Wash., Wyo. (3); Calif. (5).
Septoria agropyrina Lob., leaf spot. Iowa, Mich., N. Dak., S.Dak. (1); Wash. (3); Idaho (7). See also *Stagonospora arenaria* with which this is sometimes associated.
S. avenae Frank f. sp. *triticea* Th.Johnson—Idaho (3).
S. elymi Ell. & Ev. (*S. bromi* Sacc. var. *elymina* J.J. Davis)—Iowa, Mich., Minn., N.Dak., S.Dak., Wis. (1); Mich., Oreg., Wash. (3); Calif. (5); Miss., Wis. (6).
S. infuscans (Ell. & Ev.) Sprague, brown leaf blotch. Mont. to Calif. and Wash. (2,3,4,5).
S. nodorum Berk.—Wash. (3).
S. pacifica Sprague—Calif. (2), N.Dak. (3), Oreg. (4).
Sphaerulina divergens Rehm, on dead culms. N.Dak. (1).
Stagonospora arenaria Sacc., purple-brown blotch. Mich. to Ky. and N.Dak. (1); Oreg., Wash. (3);

Alaska (4); Calif. (5). *S. subseriata* (Desm.) Sacc. —Oreg. (4).
Synchytrium sp., purple leaf speckle. Oreg. (3).
Telimena sp., tar spot. Wash. (5).
Tiarospora perforans (Rob. ex Desm.) Hoehn., leaf speckle. Oreg. (4).
Tilletia elymi Diet. & Holw., bunt. Mont. (1,3); Colo., Oreg., Wash., Wyo. (3).
Typhula itoana Imai, snow mold. Idaho (3).
Urocystis agropyri (Preuss) Schroet., leaf or flag smut. General (1); Calif. (2); Utah, Wash., Wyo. (2,3,5); Nev. (5); Ill., Kans., Mo., Wis. (6). Also reported as *U. occulta* (Wallr.) Rabh. and *U. tritici* Koern., some races of which can infect *Elymus* spp.
Ustilago bullata Berk., head smut. Mich. (1); Mont., N.Dak., Wash. (1,3,7).
U. hordei (Pers.) Lagh., head smut. Wash. (1,3). *U.hypodytes* Amer. auths., ?(Schlecht.) Fr. American material on *Elymus* spp., reported under this name, is so far as confirmed *U. spegazzinii* or its var. *agrestis*.
U. macrospora Desm., stripe smut. Mont., N.Dak., Utah, Wash. (1,2).
U. sitanii G.W.Fisch., loose smut. Wash. (5).
U. spegazzinii Hirsch., stem smut. Calif., Wash. (3,6). Var. *agrestis* (Syd.) G.W.Fisch. & Hirsch.—Mont., Utah, Wash. (1,2,3,6,7); Wash. (5).
U. striiformis (West.) Niessl, stripe smut. Wis. to Tex., Utah, and Wash. (1); Oreg., Utah, Wash. (3); Ill., Ind., Iowa, Kans. (6); N.Mex. (7). *U. aculeata* (Ule) Liro, closely related, is reported in Idaho, Utah, Wash. (1); Oreg. (2); Nev. (5).
BENDS (hairpin)—cause unknown. Calif., Idaho, Mont., Wash. (1,2,3,7).

II. Foreign Species, Introduced for Forage Trials or Some Grown for Ornament

(1) *Elymus dahuricus* Turcz., Dahurian wildrye.
(2) *E. excelsus* Turcz.
(3) *E. sibiricus* L., Siberian wildrye.
(4) Other species.

Ascochyta agropyrina (Fairm.) Trott., leaf spot. N.Dak., Wash. (2).
Cladosporium graminum Pers. ex Lk., leaf mold. N.Dak. (4).
Claviceps purpurea (Fr.) Tul., ergot. Wash (1,2); N.Dak. (1); Mont., N.Dak., Wash. (4).
Epichloë typhina (Pers. ex Fr.) Tul., choke. Wash. (1).
Erysiphe graminis DC., powdery mildew. Mich. (1), N.Dak. (3), Wash. (4).
Fusarium spp., secondary root rot, pink mold of culms and heads: *F. equiseti* (Cda.) Sacc.—N.Dak. (1,3); *F. nivale* (Fr.) Ces.—Wash. (3); *F. oxysporum* Schlecht. em. Snyd. & Hans.—N.Dak. (1,3); *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr.—N.Dak. (1).
Helminthosporium sativum Pam., King, & Bakke, root rot. N.Dak. (1,2,3).
Macrophomina phaseoli (Maubl.) Ashby, root rot. N.Dak. (4).
Pseudomonas coronafaciens (Elliott) F.L.Stevens var. *atropurpurea* (Reddy & Godkin) Stapp, chocolate spot. N.Dak. (2,3,4).
Puccinia coronata Cda. (II,III), crown rust. Mich. (1).
P. glumarum (Schm.) Eriks. & E.Henn. (II,III), stripe rust. Wash. (2,3,4).
P. graminis Pers. (II,III), stem rust. Mich., Wash. (1,3); N.Dak. (1,2,3,4). F. sp. *tritici* identified.
P. montanensis Ell. (II,III), brown stripe rust. Mich., N.Dak. (3); N.Dak. (4).
P. procera Diet. & Holw. (II,III), leaf rust. Alaska (1).
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Wash. (2,4); N.Dak., Oreg. (3); Kans. (4).
Scolecotrichum graminis Fckl., brown stripe. Wash. (3).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* Sprague & A.G.Johnson, speckle. Wash. (4).
Septoria agropyrina Lob., leaf spot. N.Dak. (4). *S. avenae* Frank. f. sp. *triticea* Th.Johnson—N.Dak. (3). *S. nodorum* Berk., glume blotch. N.Dak. (2,3).
Stagonospora arenaria Sacc., purple-brown blotch. N.Dak. (1,3,4).
Ustilago bullata Berk., head smut. Idaho, Wash. (3).
U. hordei (Pers.) Lagh., covered head smut. Wash. (2).
U. spegazzinii Hirsch., stem smut. Wash. (1,2,3,4). Var. *agrestis* (Syd.) G.W.Fisch. & Hirsch.—Wash. (1).
U. striiformis (West.) Niessl, stripe smut. Wash (3).
Wojnowicia graminis (McAlp.) Sacc. & D.Sacc., leaf mold. N.Dak. (4).
Xanthomonas translucens (L.R.Jones, A.G.Johns., & Reddy) Dows., bacterial blight. N.Dak. (2).
BENDS (hairpin)—cause unknown. Wash. (2,4).

Eragrostis, lovegrass

(1) *E. cilianensis* (All.) Link (*E. major* Host), stinkgrass.
(2) *E. curvula* (Schrad.) Nees
(3) *E. pilosa* (L.) Beauv., India lovegrass.
(4) *E. poaeoides* (L.) Beauv. (*E. minor* Host).
(5) Other species.

Native or introduced, but mostly widely naturalized grasses; the native species except (2), predominantly annual, those introduced for erosion control are perennial; weeds in cultivated ground (1,4) or sometimes used for forage (5); several are good soil binders (3,5); (2) may be grown for ornament; useful to wildlife.

Balansia epichloë (Weese) Diehl, black ring, sterility disease. Ala., Fla., Ga., S.C., Va. (On *E. capillaris* (L.) Nees, *E. hirsuta* (Michx.) Nees, and *E. refracta* (Muhl.) Scribn.).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Okla. (2).
Curvularia geniculata (Tracy & Earle) Boed., leaf and glume mold. Iowa, Miss. (5).
Fusarium scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak. (2,3).
Helminthosporium giganteum Heald & Wolf, zonate eyespot. Md. (1,5), Tex. (5).
H. hadrotrichoides Ell. & Ev., leaf mold, sometimes on roots. Del., Mont., N.Dak. (1).
H. leucostylum Drechs., leaf spot. Del., Md., Va. (1).
H. ravenelii Curt., on glumes. Miss. (3).
H. rostratum Drechs., leaf spot. Iowa, Ky., Md. (1); Wis. (1,5).
H. sativum Pam., King, & Bakke, root rot. N.Dak. (2,3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif. (5).
Phyllachora eragrostidis Chardon, tar spot. Ala., Ga., N.Mex., Nebr., Okla., Tex. (on *E. capillaris* and *E. hirsuta*).
Piricularia grisea (Cke.) Sacc., leaf spot. Okla. (5).
Pyrenochaeta terrestris (Hans.) Gorenz, J.D.Walker, & Larson, pink root. N.Dak. (3).
Rhizoctonia solani Kuehn, secondary root rot. N.Dak. (2).
Scolecotrichum graminis Fckl., brown stripe. Okla. (5).
Sphacelotheca strangulans (Issat.) Clint., inflorescence smut. Ariz. (on *E. diffusa* Buckl. and *E. mexicana* (Hornem.) Link).

Tilletia eragrostidis Clint. & Ricker, covered smut. Miss. (on *E. glomerata* (Walt.) L.H.Dewey).
Uromyces eragrostidis Tracy (II,III), rust. N.J. to Ala., Ariz., and Nebr.; P.R. (on *E. capillaris* and *E. pectinacea* (Michx.) Steud.). O and I unknown.
Ustilago spermophora Berk. & Curt., seed smut. Mass. to S.C., La., and N.Dak. (1); Ill., Iowa (4); Md., S.Dak., Wis. (5).
Venturia nebulosa Ell. & Ev., on dead leaves. Ala. (5).
BENDS (hairpin)—cause unknown. Wash. (5).

Eremochloa

E. ophiuroides (Munro) Hack., centipedegrass.
Creeping perennial of southeastern Asia, a valuable lawn grass in the Far South.

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Fla.
Curvularia sp., leaf mold. La.
Stachybotrys sp., leaf mold. Md.
Stictis heliocotricha Ell. & Ev., on dead culms. Ala.

Erianthus, plumegrass

(1) *E. alopecuroides* (L.) Ell.
(2) *E. giganteus* (Walt.) Muhl., sugarcane plumegrass.
(3) Other species.

Tall perennial grasses of moist habitats in the Southeastern States, especially the Atlantic and Gulf Coastal Plain; also one introduced and grown for ornament; useful to wildlife.

Apiospora montagnei Sacc., on dead culms. Ga. (3).
Cerebella andropogonis Ces., on ergot-infected inflorescences. Ala. (3).
Cladosporium erianthi Thuem. (=*C. graminum* Cda.?), leaf mold. S.C. (1).
Claviceps purpurea (Fr.) Tul., ergot. Okla. (1), Ala. (3).
Colletotrichum falcatum Went (=*Physalospora tucumanensis* Speg.), anthracnose. La. (2).
Curvularia sp., leaf mold. Fla. (3).
Helminthosporium sp., leaf spot. Fla. (3).
Hendersonia donacis Sacc. and *H. erianthi* Atk., on dead culms. Ala.
Hysteropezizella andropogonis (Berk. & Curt.) Nannf. (=*H. aberrans* (Pk.) Cash), on dead culms. N.J. (3).
Leptosphaeria orthogramma (Berk. & Curt.) Sacc., on dead culms. Ala. (1), Ga. (3).
Phyllachora erianthi Orton, tar spot. Ala., Fla., Ga., S.C. (1,2,3).
Puccinia virgata Ell. & Ev. (II,III), rust. Ga. (3). O and I unknown. *P. andropogonis* Schw., reported on *Erianthus* sp. in Tenn., should perhaps be referred here.
P. polysora Underw. (II,III), rust. Fla. (1). O and I unknown.

Eriochloa, cupgrass

(1) *E. polystachya* H.B.K., Caribgrass.
(2) Other species.

Annual or perennial grasses of prairies and plains, mostly in the Southwest; some of minor forage value and useful to wildlife; (1) native in the West Indies, is grown there for forage, and has been introduced in the Gulf coast region as a forage and hay crop.

Ephelis japonica P.Henn., black head. P.R. (1). Conidial stage of a *Balansia*.
Helminthosporium sp., leaf spot. Fla. (1).
Nigrospora oryzae (Berk. & Br.) Petch, secondary leaf spot. P.R. (1).
Phyllachora eriochloae Speg., tar spot. P.R. (1,2).
Sorosporium eriochloae Griff., seed smut. Ariz., Calif. (2).
Sphaerodothis luquillensis Chardon, black leaf spot. P.R. (2).
Uromyces leptodermus Syd. (II,III), rust. P.R. (1). O and I unknown.

Euchlaena

E. mexicana Schrad., teosinte.
Tall annual of Mexico, resembling maize, occasionally cultivated in the South for forage.

Bacterium stewartii E.F.Sm., bacterial blight. Md.
Helminthosporium turcicum Pass., leaf blight. Tex.
Physoderma maydis Miyabe, brown spot. Fla., La., S.C.
Puccinia sorghi Schw. (II,III), rust. Conn., Iowa, Nebr. O and I on *Oxalis* spp.
Sclerospora graminicola (Sacc.) Schroet., downy mildew. Iowa.
Ustilago maydis (DC.) Cda., smut. Conn. to Ala., Kans. and Wis.

Festuca, fescue

I. Annual Species

(1) *Festuca octoflora* Walt., sixweeks fescue.
(2) *F. pacifica* Piper, Pacific fescue.
(3) Other species.

Mostly native (1,2) and some introduced species locally established, typically on waste sterile ground: (1) occurring throughout the United States is useful to wildlife; (2) in the Far West.

Claviceps purpurea (Fr.) Tul., ergot. Mich. (1).
Colletotrichum graminicola (Ces.) G.W. Wils., anthracnose. N.Dak. (1), Wash. (3).
Corticium fuciforme (Berk.) Wakef., pink patch. Oreg. (3).
Endoconidium temulentum Prill. & Del., blind seed disease. Md. (on *F. myuros* L.)
Fusarium nivale (Fr.) Ces., pink snow mold. Wash. (4).
F. poae (Pk.) Wr., head mold, silvertop. Wash. (1).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. Wash. (3).
Helminthosporium sativum Pam., King, & Bakke, root rot. N.Dak. (1).
Mycosphaerella sp., on leaves. Oreg. (3).
Ophiobolus graminis Sacc., root and stem rot. Ark. (1), Oreg. (3).
Ovularia pusilla (Ung.) Sacc. & D. Sacc., tan leaf spot. Oreg. (3).
Phyllachora silvatica Sacc. & Speg., tar spot. Oreg. (3).
Puccinia glumarum (Schm.) Eriks. & E.Henn., stripe rust. Wash. (1).
P. graminis Pers. (II,III), stem rust. Kans. (1); Calif., Oreg. (2,3); Mich., Minn., Wash. (3). The f. sp. *avenae* identified in natural collections.
P. piperi Ricker (II,III), leaf rust. Calif., Oreg. (2); Calif. (3).
Pythium arrhenomanes Drechs., root browning. N.Dak. (1).
Rhizoctonia solani Kuehn, secondary root rot. N.Dak. Stem rot, brown patch—Oreg., Wash. (3).
Septoria tenella Cke. & Ell., leaf spot. N.Dak. to Kans., Colo., and Wash., also N.J. (1); Oreg. (3).
Tilletia festuca-octoflorana Zundel, seed smut. Mo. (1), Oreg. (3). *T. fusca* Ell. & Ev., seed smut, bunt. Idaho, Mont., Nev., Oreg., Wash., Wyo. (1); Wash. (2,3); Calif. (3).

Uromyces hordeinus Arth. (II,III), rust. Miss., Tex. (1). O and I on *Nothoscordum bivalve. U. jacksonii* Arth. & Fromme (II,III)—Calif. (2).
Ustilago mulfordiana Ell. & Ev., head smut. Ariz., Colo., Idaho, Mont., Oreg., Utah, Wash., Wyo. (1); Idaho, Oreg., Wash. (2,3).
BENDS (hairpin)—cause unknown. Wash. (2).

II. Perennial Species, Native Range Grasses

(1) *Festuca arizonica* Vasey, Arizona fescue, mountain bunchgrass.
(2) *F. idahoensis* Elmer, Idaho fescue, blue bunchgrass.
(3) *F. viridula* Vasey, greenleaf fescue, green mountain bunchgrass.
(4) Other species.

Perennial tuft-forming grasses in meadows or open woodlands, medium to high elevations in the Rocky Mountain and Pacific States; all valuable for forage, especially (2) and (3); useful to wildlife. For *F. ovina* and *F. rubra*, also occurring in this range, see the following section.

Brachycladium spiciferum Bainer, on dead roots and culms. Wash. (2).
Cercosporella herpotrichoides Fron, foot rot. Idaho, Oreg., Wash. (2).
Claviceps purpurea (Fr.) Tul., ergot. Idaho, Oreg. (2); Colo., Utah, Wyo. (4).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Idaho (4).
Erysiphe graminis DC., powdery mildew. Wash. (2).
Fusarium nivale (Fr.) Ces., pink snow mold. Idaho, Oreg., Wash. (2).
Helminthosporium dictyoides Drechs., leaf spot. Wash. (4).
Hendersonia culmicola Sacc. var. *minor* Sacc., on dying leaves, sheaths, or culms. Calif. (2).
Leptosphaeria culmifraga (Fr.) Ces., on dead culms. Oreg. (4).
Lophodermium arundinaceum (Schrad. ex Fr.) Chev., on dead leaves and stems. Ariz. (1).
Mycosphaerella tassiana (de N.) Johans., on leaves. Wyo. (4). *M. tulasnei* (Jancz.) Lindau—Wash. (2), Oreg. (4).
Ophiobolus festucae Tracy & Earle, on leaves. Colo. (4).
Ovularia hordei (Cav.) Sprague, leaf spot. Utah (4). *O. pusilla* (Ung.) Sacc. & D. Sacc.—Idaho (2).
Phleospora idahoensis Sprague, leaf spot. Idaho (2).
Phoma sp., assoc. with black stem. Idaho (2), Mont. (4).
Phyllachora silvatica Sacc. & Speg., tar spot. Calif. (2), Oreg. (4).
Phyllosticta sp., leaf spot. Idaho (4).
Pseudomonas coronafaciens (Elliott) F.L.Stevens var. *atropurpurea* (Reddy & Godkin) Stapp, chocolate spot. Wash. (2).
Puccinia cockerelliana Bethel (II,III), rust. Colo. (on *F. thurberi* Vasey). O and I on *Thalictrum fendleri.*
P. coronata Cda. (II,III), crown rust. Oreg. (on *F. subulata* Trin.).
P. crandallii Pam. & Hume (II,III), leaf rust. Mont. to Colo., Calif., and Wash. (2,4); Wash. (3). O and I on *Symphoricarpos* spp.
P. graminis Pers. (II,III), stem rust. Colo. (1); Mich., Oreg., Wash. (2); Calif., Colo., Wyo. (4). The var. *phlei-pratensis* (Eriks. & E.Henn.) Stakman & Piemeisel identified in natural collections.
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. N.Dak. (on *F. scabrella* Torr.).
Pythium graminicola Subr., root necrosis. Wash. (2).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, leaf speckle. Wash. (2), Wyo. (4). *S. everhartii* (Sacc. & Syd.) Sprague & A.G.Johnson—Mont., Utah (4).
Septogloeum sp., leaf spot. Idaho (2).
Septoria nodorum Berk., brown blight or leaf scald. Wash. (4). *S. tenella* Cke. & Ell., leaf spot. Oreg., Wash., Wyo. (2).
Ustilago sp., seed smut. Colo. (3).
U. bullata Berk., head smut. Wash. (2).
U. striiformis (West.) Niessl, stripe smut. Iowa, Md. (on *F. obtusa* Spreng.).
Wojnowicia graminis (McAlp.) Sacc. & D.Sacc., secondary root rot. Oreg. (2).
BENDS (hairpin)—cause unknown. Wash., Wyo. (2,4).

III. Perennial Species, Cultivated Forage and Turf Grasses

(1) *Festuca elatior* L., including var. *arundinacea* (Schreb.) Wimm., meadow fescue.
(2) *F. ovina* L., sheep fescue, also var. *brachyphylla* (Schult.) Piper, alpine fescue.
(3) *F. rubra* L., red fescue, also var. *commutata* Gaud., Chewings fescue, and var. *heterophylla* (Lam.) Mut., shade fescue.
(4) Other species.

Introduced and widely naturalized (1,3) or native (2) grasses, cultivated for forage and hay, especially (1) and (2), or for fine turf (3) and sometimes (2), chiefly in northern and upland regions; cultivation of (1) and (3) for seed chiefly in Oregon.

Anguina sp., nematode gall (seed). Oreg. (3).
Aphanomyces sp., secondary root rot. N.Dak. (1,3).
Ascochyta graminicola Sacc., leaf spot. N.Dak., Oreg. (3). *A. hordei* Hara—Utah (1).
Cercospora festucae Hardison, leaf spot. Ky., Oreg., Tex. (1).
Cladosporium herbarum Lk., on dead leaves. Calif. (2).
Claviceps purpurea (Fr.) Tul., ergot. General (1); Md., Mo. (2); occasional, N.Y. to Ky. and Minn. and Pacific Northwest (3).
Colletotrichum graminicola (Ces.) G.W. Wils., anthracnose. Occasional, N.Y. to Va., Okla., and Minn. (*); Wash. (3).
Corticium fuciforme (Berk.) Wakef., pink patch. Oreg. (3).
Curvularia inaequalis (Shear) Boed., seed mold. Oreg. (1).
Endoconidium temulentum Prill. & Del., blind seed disease. Oreg. (1).
Epicoccum sp., secondary leaf spot. Ky. (1).
Erysiphe graminis DC., powdery mildew. Wash. (2); Mich., Oreg. (3).
Fusarium culmorum (W.G.Sm.) Sacc., foot rot. Wash. (3).
F. nivale (Fr.) Ces., snow mold. Mich., Minn., N.Dak., N.Y., Wash., Wis. (3); Idaho (1,2,3).
F. poae (Pk.) Wr., silvertop, head mold. Pa. (3).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak. (*).
Helminthosporium dictyoides Drechs., net blotch, leaf spot. Maine to Va., La., and Iowa, also Idaho, Wash. (1); Oreg. (3).
H. sativum Pam., King, & Bakke, leaf spot, root rot. Iowa (1); N.Dak., Va. (3).
Hendersonia sp., leaf mold. Wyo. (2). *H. culmicola* Sacc.—Oreg. (3). *H. simplex* Schroet.—Calif. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Lophodermium arundinaceum (Schrad. ex Fr.) Chev., on dead leaves and stems. Calif. (1,2).
Marasmius sp. (*?M. insititius* Fr.), collar rot. Ind. (on *F. capillata* Lam.).
Meloidogyne sp., root knot nematodes. (1,2).
Mycosphaerella tulasnei (Jancz.) Lindau, leaf mold. Oreg. (1,3).
Ophiobolus graminis Sacc., root and culm rot. Ark. (1).
Phaeoseptoria festucae Sprague, secondary leaf spot. Calif. (2), Oreg. (3).
Phoma sp., associated with black stem. Idaho (1).
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Maine, R. I. (1). *P. silvatica* Sacc. & Speg.—Calif., Oreg. (3).
Pseudomonas coronafaciens (Elliott) F.L.Stevens var. *atropurpurea* (Reddy & Godkin) Stapp, chocolate spot. Wash. (3).
Puccinia coronata Cda. (II,III), crown rust. General (1, the var. *arundinacea* usually resistant); N.Y. (2).
P. crandallii Pam. & Hume (II,III), leaf rust. Colo., N.Dak., Nev., Oreg., Wash., Wyo. (2,3).
P. graminis Pers. (II,III), stem rust. General (1); Calif., Wash. (3). The var. *phlei-pratensis* (Eriks. & Henn.) Stakm. & Piemeisel has been identified in natural collections.
P. piperi Ricker (II,III), leaf rust. Utah (1).
P. poae-sudeticae (West.) Jørst. (II,III),—Oreg. (1).
P. rubigo-vera (DC.) Wint.—N.Dak., Vt. (1).
Pythium spp., root browning, damping-off: *P. arrhenomanes* Drechs.—N.Dak. (1,3); *P. debaryanum* Hesse—N. Dak. (1,3); *P. irregulare* Buism.—N.Dak. (1).
Rhizoctonia sp. (*?Sclerotinia homoecarpa* F.T.Bennett), dollar spot. General in Northeastern and North Central States (2,3). See note relative to *S. homoecarpa* under *Agrostis alba*. Only the sterile stage of the fungus identified as this has been observed in the U S.
R. solani Kuehn, brown patch, root and culm rot. Md., N.C. (1); general (2,3).
Scolecotrichum graminis Fckl., brown stripe. Kans. (1); Wash., Wis. (3).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, speckle. Calif. (1), Wash. (2). *S. everhartii* (Sacc. & Syd.) Sprague & A.G Johnson—Calif., Wash., Wyo. (2); Mont (2.3).
Septoria avenae Frank, leaf spot. Utah (1). *S. tenella* Cke. & Ell.—Ill., Wash. (1); Wash., Wyo. (2); Oreg., Wash. (3).
Spermospora subulata (Sprague) Sprague, eyespot. Oreg., Wash. (3).
Stagonospora simplicior Sacc. & Berl., on leaves. Colo. (2).
Stemphylium botryosum Wallr., seed mold. In commercial samples.
Synchytrium sp., leaf speckle. Oreg. (3).
Ustilago striiformis (West.) Niessl, stripe smut. N.Dak. (2).
BENDS (hairpin)—cause unknown. Ky., Mich. (1); Wash. (1,2,3).

Fluminea

F. festucacea (Willd.) Hitchc., rivergrass.

Perennial grass of marshes and river margins in the North Central States and Oregon; of minor forage value and a constituent of marsh hay; useful to wildlife.

Hendersonia trimera Cke., leaf mold. ?Mont.
Piricularia grisea (Cke.) Sacc., gray leaf spot. N.Dak.
Puccinia coronata Cda. (II,III), crown rust. Mont., N.Dak., N.Y., S.Dak.
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Mont., N.Dak. Var. *agropyrina* (Eriks.) Arth.
Septoria avenae Frank, leaf spot. S.Dak.
Stagonospora arenaria Sacc., purple leaf spot. N.Dak.
Ustilago arthurii Hume, leaf smut. Oreg.

Gastridium

G. ventricosum (Gouan) Shinz & Thell., nitgrass.

Annual of Europe, in waste ground and a weed in cultivated fields, Oregon to Texas.

Helminthosporium sp., leaf spot. Oreg.
Puccinia graminis Pers. (II,III), stem rust. Ariz.

Glyceria

I. Section *Euglyceria*

(1) *Glyceria fluitans* (L.) R.Br., mannagrass.
(2) *G. septentrionalis* Hitchc., eastern mannagrass.
(3) Other species.

Perennial grasses of marshes or wet ground, mostly in the Northeastern and North Central States, (2) also extending to South Carolina and Texas, and other species to the Gulf States and Pacific coast.

Claviceps purpurea (Fr.) Tul., ergot. Wis. (1,2); Ind., Iowa (2); Idaho, Maine, Mich., Wis. (3).
Endoconidium temulentum Prill. & Del., blind seed disease. Oreg. (3).
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail. Mich. (1,2), N.Y. (2).
Fusarium heterosporum Nees, head mold following ergot. Wis. (1,2).
Sclerotium globuliferum J.J.Davis, on leaves and culms. Wis. (2).
Scolecotrichum graminis Fckl., brown stripe. Mich., N.Y. (1); Oreg. (1,2); Wis. (2).
Uromyces amphidymus Syd. (II,III), leaf rust. Wis. (1,2); Ill., Ind., N.J. (2); R.I. (3). O and I unknown.
Ustilago davisii Liro (*U. longissima* (Sow. ex Schlecht.) Meyen var. *macrospora* J.J. Davis), leaf smut. Ill., Maine, Mich. (1,2); Miss. (2); Wis. (3).

II. Section *Hydropoa*

(1) *Glyceria elata* (Nash) Hitchc., tall mannagrass.
(2) *G. grandis* S.Wats., American mannagrass.
(3) *G. pauciflora* Presl., weak mannagrass.
(4) *G. striata* (Lam.) Hitchc., fowl mannagrass.
(5) Other species.

Perennial grasses of marshes and moist meadows or woodlands: (1) and (3) chiefly in the Rocky Mountain and Pacific Coast States, (2) also in the North Central and Eastern States, (4) nearly throughout the United States; all useful forage grasses where sufficiently abundant, especially (4) and (1); useful to wildlife.

Claviceps purpurea (Fr.) Tul., ergot. Okla., Wash., Wis. (4); Idaho, Maine, Mass., Mich., Wis. (5).
Cylindrosporium glyceriae Ell. & Ev., leaf spot. Wis. (4,5).
Diplodina graminea Sacc. (*Ascochyta*), on culms. Tex. (4).
Entyloma spectabile Karst., leaf smut. Wis. (5).

Epichloë typhina (Pers. ex Fr.) Tul., cat-tail. Ga., Ill., Iowa, Md., Mich., Miss., Wis. (4); Mich. (5).
Erysiphe graminis DC., powdery mildew. Mont. (4), Pa. (5).
?*Euryachora* sp., char spot. Wash. (3).
Ovularia pusilla (Ung.) Sacc. & D. Sacc. (*O. pulchella* (Ung.) Sacc.), leaf spot. Wash. (1), Calif. (5).
Phaeoseptoria festucae Sprague, leaf spot. N.Dak. (3).
Puccinia coronata Cda. (II,III), crown rust. Calif., Oreg. (1,3); N.Dak. (2); Wash. (3); Idaho (4).
P. graminis Pers. (II,III), stem rust. Calif. (1,4); Mo., Wis. (2); Calif., Idaho, Mont. (3). The f. sp. *avenae* identified in natural collections.
P. rubigo-vera (DC.) Wint., leaf rust. Ind., Iowa, Minn., S.Dak. (2). Reported as var. *agropyrina* (Eriks.) Arth.
Sclerotium globuliferum J.J.Davis, on leaves and culms. Wis. (2). First reported as *Burrillia globulifera* J.J.Davis but found not to be a smut.
?*S. rhizodes* Auers., leaf rot. Wis. (4). See note on this name under *Agrostis alba*.
Scolecotrichum graminis Fckl., brown stripe. Wash. (1,2); Idaho, N.Dak. (2); Oreg. (2,4); Wyo. (3); Wis. (5).
Septoria avenae Frank, leaf spot. Wyo. (1,2); Wash. (3). *S. glycericola* Sprague—Oreg. (1,4); N.Dak. (2); Colo., Wash., Wyo. (3); Ky., Wash. (4); Mass. (5). *Septoria* sp. reported from Calif., Idaho (3) may be this.
Stagonospora foliicola (Bres.) Bub., leaf spot. Colo. (1). *S. glycericola* Sprague—Minn. (4), N.Dak. (2).
Ustilago arthurii Hume, leaf smut. Iowa (2).
U. davisii Liro—Maine (5).
U. longissima (Sow. ex Schlecht.) Meyen (*U. glyceriae* Cif.)—Oreg. (1); widespread (2); Maine, Pa., Utah (4); N.H., Oreg., Pa. (5).

Gymnopogon

G. ambiguus (Michx.) B.S.P., skeletongrass.

Perennial occurring in open woods of the Coastal Plain and inland from New Jersey to Florida and Texas; useful to wildlife.

Balansia epichloë Diehl, black ring, sterility disease. Ga., N.C., Va.

Hackelochloa

H. granularis (L.) Kuntze, pitscalegrass.

Annual of tropical regions occurring in old fields in the Gulf States and the Southwest; of minor forage value; useful to wildlife.

Puccinia levis (Sacc. & Bizz.) Magn., rust. P.R. O and I unknown.

Heteropogon

(1) *H. contortus* (L.) Beauv., tanglehead.
(2) *H. melanocarpus* (Ell.) Benth., sweet tanglehead.

Perennial (1) of dry areas throughout the tropics; in the United States occurring sparingly from Texas to Arizona, and in Hawaii; of value for forage and straw. Annual (2) occurring in open woods and wastes in the Gulf States to Arizona.

Cerebella andropogonis Ces., on inflorescences (associated with ergot). Ala. (1).
Helminthosporium sp., leaf spot. Fla. (2).
Puccinia versicolor Diet. & Holw. (II,III), rust. T.H. (1). O and I unknown.
Sorosporium contortum Griff., loose smut. Ariz., N.Mex. (1).
Sphacelotheca andropogonis (Opiz) Bub., covered smut. Ariz. (1). *S. monilifera* (Ell. & Ev.) Clint.—Ariz., T.H. (1). *S. nealii* (Ell. & F.W.Anderson) Clint.—Fla. (2).

Hierochloë

(1) *H. odorata* (L.) Beauv., sweetgrass.
(2) *H. occidentalis* Buckl., California sweetgrass.

Perennial grasses of bogs and moist meadows: (1) ranging from New Jersey to Oregon and Alaska, and at high elevations in the Rocky Mountains; (2) near the coast in the Pacific States; used in basketry; useful to wildlife.

Ascochyta graminicola Sacc., leaf spot. N. Dak., S. Dak., Wis. (1).
Helminthosporium sp., leaf blotch. Calif. (1).
Puccinia coronata Cda. (II,III), crown rust. N.Dak., N.Y. (1).
P. graminis Pers. (II,III), stem rust. Calif. (1,2), Oreg. (2). The f. sp. *avenae* identified in natural collections.
Rhizoctonia solani Kuehn, ?root rot. Wyo. (1).
Septoria sp., leaf spot. Minn. (1). *S. oudemansii* Sacc. —?N.H.

Hilaria

(1) *H. belangeri* (Steud.) Nash, curly mesquite.
(2) *H. jamesii* (Torr.) Benth., galleta.
(3) *H. mutica* (Buckl.) Benth., tobosagrass.

Perennials of arid plains and foothills, mostly in the Southwest: (1) and (3) sod-forming, occurring in southern Arizona to central Texas; (2) erect and tufted, in Wyoming, Utah, and California; all furnish forage and are efficient soil binders.

Claviceps cinerea Griff. (=*C. purpurea* (Fr.) Tul.?), ergot. Ariz. (1,3); Okla. (2,3); N.Mex., Tex. (3).
Fusarium scirpi Lambotte & Fautr. var. *acuminatum* Ell. & Ev.) Wr., secondary root rot. N.Dak. (2,3).
Helminthosporium sp., leaf spot. Tex. (1).
Puccinia aristidae Tracy (II,III), rust. Ariz. (2), N.Mex. (2,3). O and I on many genera in various families.
Ustilago aegopogonis P.Henn., head smut. Ariz., Tex. (1). *U. affinis* Ell. & Ev. var. *hilariae* (P.Henn.) G.W.Fisch. & Hirsch.—N.Mex., Tex. (1). *U. hilariae* Ell. & Tracy—Colo. (2), N.Mex. (2,3).
U. hypodytes Amer. auths., ? (Schlecht.) Fr., stem smut. Utah (2).

Holcus

(1) *H. lanatus* L., velvetgrass.
(2) *H. mollis* L., German velvetgrass.

Perennial grasses of Europe, cultivated for forage and hay: (1) widely naturalized in the Eastern, Central, and Pacific States; (2) chiefly in California to Washington.

Ascochyta graminicola Sacc. var. *holci* Sacc., on leaves. Wash. (1).
Cercosporella holci Sprague, tan leaf spot. Oreg., Wash. (1).
Claviceps purpurea (Fr.) Tul., ergot. Oreg., Wash. (1).

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Ind., Md., Pa., Wash. (1).
Dilophospora alopecuri Fr., twist. Calif., Oreg., Wash. (1).
Endoconidium temulentum Prill. & Del., blind seed disease. Oreg. (1).
Entyloma crastophilum Sacc., leaf smut. Calif., Conn., N.Y. (1).
Fusarium nivale (Fr.) Ces., snow mold. Mich., Minn., Wash., Wis. (1).
Helminthosporium triseptatum Drechs., leaf spot. Mich., N.Y., Oreg., Wash. (1).
Mycosphaerella tulasnei (Jancz.) Lindau, leaf mold. Wash. (1).
Ophiobolus graminis Sacc., take-all, root rot. Oreg. (1).
Ovularia pusilla (Ung.) Sacc. & D. Sacc., leaf spot. Oreg. (1).
Puccinia coronata Cda. (II,III), crown rust. Mass. to Ga. and Miss.; Oreg., Wash., T.H.
P. graminis Pers. (II,III), stem rust. Iowa, Oreg. (1). The f. sp. *avenae* identified in natural collections.
P. rubigo-vera (DC.) Wint. (II,III),leaf rust. Mass., N.C., N.Y., Va., Calif., Wash. (1). Reported as var. *agropyri* (Eriks.) Arth., and f. sp. *holcina* (Eriks.) Mains and *triseti* (Eriks.) Mains.
Rhizoctonia solani Kuehn, brown patch, leaf rot. Oreg. (1).
Septoria tritici Rob. ex Desm. f. *holci* Sprague, speckled leaf blotch. Oreg., Wash. (1).
Tilletia holci (West.) Schroet., bunt. Mass., Pa., Oreg., Wash. (1).
Ustilago striiformis (West.) Niessl, stripe smut. Oreg., Wash. (1).

Hordeum

I. *Hordeum vulgare* L., barley

Cultigen of Old World origin, grown throughout the Temperate Zone; in the United States chiefly in the Northern and Western States, especially the northern Mississippi Valley and California, with minor areas in the South Central States and Middle Plains. Most of the records apply to barley in general; some refer to particular agronomic types such as *H. aegiceras* Royle ex Walp., pearl barley, *H. distichon* L., two-rowed barley, *H. hexastichon* L., six-rowed barley, and *H. vulgare* var. *trifurcatum* (Schlecht.) Alefeld, beardless barley.

Alternaria sp. (probably *A. tenuis* Nees ex Cda.), black point, kernel smudge, seed mold. Cosmopolitan; associated with mechanical or weather damage.
Aphanomyces euteiches Drechs., in roots, ? rootlet rot. Wis.
Ascochyta ?graminicola Sacc., leaf spot. Ill., Wash.
Cercosporella herpotrichoides Fron, foot rot. Idaho, Oreg., Wash.
Cladosporium graminum Pers. ex Lk., seed mold, sometimes secondary on leaves. Cosmopolitan. See note under *Avena*.
Claviceps purpurea (Fr.) Tul., ergot. General (*).
Colletotrichum graminicola (Ces.) G.W.Wils, anthracnose. N.Y. to Ala., Tex., and N.Dak.; Oreg., Wash.
Erysiphe graminis DC., powdery mildew. General in humid regions, especially on winter barley, less frequent on spring barley in the North and West. Usually identified as f. sp. *hordei* Em. Marchal, and restricted to *Hordeum*, but the physiological races occurring on barley are limited to *H. vulgare* and closely related species. On all barley types, but individual varieties may be resistant.
Fusarium arthrosporioides Sherb. and F. *avenaceum* Fr.) Sacc., head mold. Wis. *F. culmorum* (W.G.Sm.) Sacc., head blight, root and stem rot. Iowa, Minn., Mo., Nebr., Oreg., S.Dak., Wash. *F. culmorum* var. *leteius* Sherb., seedling blight. Calif., Oreg. *F. equiseti* (Cda.) Sacc. and *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. Calif., N.Dak., Wis. In the Snyder & Hansen terminology all these species are reduced to *F. roseum* Lk.
F. nivale (Fr.) Sacc., snow mold. Mich., Minn., Wash., Wis. Conidial stage of *Calonectria nivalis* Schaffnit, but not reported in this stage in U.S.
F. oxysporum Schlecht., secondary root rot. N.Dak.
Gibberella zeae (Schw.) Petch, scab, head blight. Eastern and Central States to Tex. and N.Dak., also Calif. but not in Pacific Northwest (*).
Gloeosporium bolleyi Sprague, seed rot, root rot. N.Dak., Wash. SEE ALSO *Colletotrichum graminicola* and *Pyrenochaeta terrestris*.
Helminthosporium californicum Mackie & Paxton, rusty blotch. ?Ala., Calif. Probably a form of *H. sativum*.
H. gramineum Rabh., stripe. General (*). Conidial stage of *Pyrenophora graminea* S. Ito & Kuribay., found in Japan but not yet reported in the U.S.
H. sativum Pam., King, & Bakke, spot blotch (leaves), root rot. General (*). Conidial stage of *Ophiobolus sativus* S. Ito & Kuribay., found in Japan but not yet reported in U.S.
H. teres Sacc.: SEE *Pyrenophora teres*.
Hendersonia graminis McAlp.: SEE *Wojnowicia graminis*.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Heterosporium avenae Oud., leaf mold following stripe disease. Mont.
Hormodendrum hordei Bruhne (*?Cladosporium* sp.), leaf mold. Mont.
Marasmius tritici Young (=*M. scorodonius* Fr.?), root and collar rot. Ill.
Meloidogyne sp., root knot nematodes. T.H.
Naucoria cerealis Boewe, ? root and collar rot. Ill.
Ophiobolus graminis Sacc., take-all. Calif., ?Iowa, ?Mo., ?Nebr., Oreg.
Phoma terrestris Hans.: SEE *Pyrenochaeta*.
Pseudomonas atrofaciens (McCull.) F. L. Stevens, basal glume rot. Ill.
Puccinia glumarum (Schm.) Eriks. & E. Henn. (II,III), stripe rust. Western N. Dak. and S. Dak. to Colo., Calif., and Wash. (*).
P. graminis Pers. (II, III), stem rust. General (*). The f. spp. *secalis* Eriks. & E. Henn. and *tritici* Eriks. & E. Henn. identified in natural collections.
P. hordei Otth (*P. anomala* Rostr.) (II, III), dwarf leaf rust. General (*). O and I on *Ornithogalum* spp. in Europe; in U.S. only experimentally on *O. umbellatum*.
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Relatively rare, though authentic records exist (Nebr., Tex.); most of the leaf rust on barley is caused by *P. hordei*. Natural infection with the vars. *agropyrina* (Eriks. & E. Henn.) Arth., *secalis* (Eriks.) Carl., and *tritici* (Eriks. & Henn.) Carl. is recorded.
Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson (? *P. graminis* Ell. & Ev.), pink root, secondary root rot. Minn. to Nebr. and Mont.
Pyrenophora teres Drechs., net blotch. Widespread but most frequent in the North Central and Eastern States, occasionally in the South and also extending to Calif., Oreg., and Idaho. By some authors referred to the older names *P. relicina* (Fckl.) Sacc. and *P. trichostoma* (Fr.) Fckl. (or *Pleospora trichostoma* (Fr.) Ces. & de N.).
Pythium spp., root rot, seedling blight: *P. aristosporum* Vanterpool—N. Dak.; *P. arrhenomanes* Drechs.—Oreg., S. Dak.; *P. debaryanum* Hesse—Colo., Iowa, Wash.; *P. graminicola* Subr.—Calif., Iowa; *P.*

hypogonum Middleton—Mo.; *P. rostratum* Butl.—Calif.

Rhizoctonia solani Kuehn, secondary root rot. Oreg., Wash. Eyespot. Wash.

Rhynchosporium secalis (Oud.) J. J. Davis, scald. North Central States and Pacific Northwest, occasional in East (Pa.), South (Ala., Tex.), and Calif. (*).

Sclerospora macrospora Sacc., downy mildew. Calif., Mo.

Sclerotium rolfsii Sacc., root rot. Calif.

Scolecotrichum graminis Fckl., brown stripe. Iowa, Kans., Ohio, Utah.

Selenophoma donacis (Pass.) Sprague & A. G. Johnson var. *stomaticola* (Baeumler) Sprague & A. G. Johnson, speckle. Oreg.

Septoria passerinii Sacc., speckled leaf blotch. North Central States to S.C., Ark., and N.Dak.; Idaho, Oreg. (rare).

Trichoderma viride Pers. ex Fr., seed rot, preemergence blight. Minn.

Tylenchus spiralis Cassidy, root nematode. T.H.

Typhula itoana Imai, snow mold. Idaho.

Ustilago hordei (Pers.) Lagerh., covered smut. General (*).

U. nigra Tapke, shallow loose smut. Widespread; specifically identified in Ark., Colo., Del., Ill., Iowa, Kans., Md., Mo., N.Y., Pa., Wash., Wis., but has been confused with *U. nuda*. Some authorities consider this a race of *U. avenae*.

U. nuda (Jens.) Rostr., deep loose smut. General (*).

Wojnowicia graminis (McAlp.) Sacc. & D. Sacc., secondary root rot. Calif., Oreg., Wash.

Xanthomonas translucens (L.R.Jones, A.G.Johnson, & Reddy) Dows., bacterial blight, leaf spot. North Central States, occasionally south to S.C. and Tex., and west to Calif. and Oreg. This race has been designated f. sp. *hordei* Hagborg.

BENDS—cause, unknown. ?Miss., Utah, Wash.

FALSE STRIPE—cause unknown, perhaps nutritional. See also LEAF SPOT, NONPARASITIC. Ind., Mo., N.Dak., N.Y., Oreg., Wis., ?Calif.

FOOT ROT—cause undetermined. Calif., Md., Mich., Oreg., Va., Wash. See also *Fusarium, Gibberella, Helminthosporium, Ophiobolus,* and *Pythium.*

LEAF SPOT, NONPARASITIC—causal factors not fully known but apparently due to malnutrition (e.g. ? boron injury, potassium deficiency); prevalent in dry seasons. Calif., Ariz., Idaho, Minn., Mo., Wis. See also *Helminthosporium, Pyrenophora, Septoria.*

MOSAIC—unidentified virus. Okla. Susceptibility to systemic infection with the following viruses has been experimentally demonstrated: *Marmor campestre* McK., *M. graminis* McK., *M. tritici* Holmes, *M. virgatum* McK.

II. Noncultivated Species

(1) *Hordeum jubatum* L., including var. *caespitosum* (Scribn.) Hitchc.
(2) *H. murinum* L., mouse barley.
(3) *H. nodosum* L., meadow barley.
(4) *H. pusillum* Nutt., little barley.
(5) Other species.

Perennial (1,3) or annual (2,4,5) grasses: native (1,3,4) and distributed nearly throughout the United States, especially the Middle West and Pacific coast, or introduced (2) and of limited distribution, chiefly in the West; of some forage value before the heads form; sometimes troublesome weeds (1,2,4); useful to wildlife.

Ascochyta graminicola Sacc., leaf spot. Idaho (2); Alaska (3). *A. hordei* Hara—Idaho (2).

Claviceps purpurea (Fr.) Tul., ergot. Iowa, Mont., Okla., Oreg., Wash., Wis. (1); Wash. (2); Minn., Alaska (3).

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Pa. (1); Kans. (4).

Corynebacterium agropyri (O'Gara) Burkh., bacterial blight. Mont. (1).

Dilophospora alopecuri (Fr.) Fr., twist. Utah (1), Oreg. (3).

Endoconidium temulentum Prill. & Del., blind seed disease. Oreg.

Erysiphe graminis DC., powdery mildew. Colo., Minn., Miss., Mo., Mont., Nebr., Tex., Wis. (1); Colo., Oreg. (2); Ga., Kans. (4). Referred to f. sp. *hordei* Em. Marchal, but these hosts are resistant to the physiological races commonly found on barley.

Fusarium culmorum (W.G.Sm.) Sacc., root and culm rot. Wash. (1,3).

F. equiseti (Cda.) Sacc., secondary root rot. N.Dak. (1,5).

F. nivale (Fr.) Ces., snow mold. Oreg., Wash. (2,3); Wash. (1,5).

F. scirpi Lambotte & Fautr., var. *acuminatum* (Ell. & Ev.) Wr. and var. *compactum* Wr., secondary root rot. N.Dak. (1,5).

F. sporotrichioides Sherb., secondary root rot, head mold. N. Dak. (1).

Gibberella zeae (Schw.) Petch, foot rot, head blight. S.Dak. (3).

Helminthosporium sativum Pam., King, & Bakke, root rot, leaf blotch, Minn., N.Dak. (1); Calif., Wash. (2); N.Dak. (5).

Ophiobolus graminis Sacc., foot rot. Ark. (4).

Phyllachora graminis (Pers. ex Fr.) Tul., tar spot. Ill., Wis. (1); Calif. (5).

Phytophthora cactorum (Leb. & Cohn) Schroet., leaf rot. N.Dak. (1).

Puccinia coronata Cda. (II,III), crown rust. Wash. (3,5).

P. glumarum (Schm.) Eriks. & E.Henn. (II,III), stripe rust. Mont. to Colo., Calif., and Wash. (1); Calif. (2,3,5); Wash. (2); Colo., Idaho, Oreg., Wash. (3,5); Tex., Utah (4); Ariz. (5).

P. graminis Pers. (II,III), stem rust. General in the North Central States to Tex., Calif., and Wash., occasional east to Ky. and Pa. (1); Calif., Oreg., Wash. (2,3); Idaho, Mich., Wyo. (3); Kans. (4); Calif., Md., Mich., N.Dak. (5). The f. spp. *secalis* and *tritici* occur commonly on (1) and (4); *tritici* also identified on (3).

P. hordei-murini Buchw. (II,III), leaf rust. Calif., Oreg., Wash. (2,3,5). O and I unknown.

P. montanensis Ell. (II,III), brown stripe rust. Colo., Mont., Utah (1), N.Dak. (5). O and I on *Berberis fendleri.*

P. pygmaea Eriks. (II). Alaska (on *H. nodosum* var. *boreale* (Scribn. & Smith) Hitchc.). O and I on *Berberis* in Europe.

P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Frequent from Mich. and Ind. to Colo. and N.Dak., also N.Y., Va., Oreg., Wash. (1); Colo., Idaho, Oreg., Utah, Wash. (3); Kans., Tex. (4); also other species in same range. The vars. *agropyrina* (Eriks.) Arth. and *impatientis* (Arth.) Mains, and numerous special forms based on aecial hosts, but none occurring on cereals, have been distinguished.

Pyrenophora teres (Died.) Drechs., net blotch. Calif. (2).

Pythium arrhenomanes Drechs., root browning. N.Dak. (1,5). *P. debaryanum* Hesse, damping-off. N.Dak. (5). *P. graminicola* Subr., root necrosis. Wash. (2,5).

Rhizoctonia solani Kuehn, secondary root rot. N.Dak. (1,5); Mont., Nebr., S.Dak. (4); Oreg. (5).

Rhynchosporium secalis (Oud.) J.J.Davis, scald. Calif., Oreg. (1,2).

Sclerotium rhizodes Amer. auths., ?Auers., leaf rot. Wis. (1).
Scolecotrichum graminis Fckl., brown stripe. N.Y. to Kans. and Wash. (1); Kans. (1,3); Idaho, Mont., Oreg., Wash. (3); Kans., Mo., Mont., S.Dak. (4).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson, var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, speckle. N.Dak. (5).
Septoria avenae Frank f. sp. *triticea* Th.Johnson, leaf spot. Oreg. (2).
S. nodorum Berk., glume blotch. N.Dak. (1); Idaho (3). *S. passerinii* Sacc., leaf spot. Iowa, Minn., N.Dak., S.Dak., Wis. (1); Iowa, Mont., Oreg., Wyo. (3); N.Dak. (5).
Tilletia texana Long, bunt. Tex. (3), Mo. (4). *T. foetida* (Wallr.) Liro may also occur on (3).
Urocystis agropyri (Preuss) Schroet., flag smut. Oreg. (1,3); Wis. (1).
Uromyces hordeinus Arth. (II,III), leaf rust. Miss. (1); Kans. to La., Calif., and Wash. (3); Ind. to Ga., Tex., and Nebr. (4). O and I on *Nothoscordum bivalve*.
U. jacksonii Arth. & Fromme (II,III)—Oreg. (1,3); Calif., Colo., Wash. (3). O and I unknown.
U. musticus Arth. (II,III)—Colo., Idaho, N.Mex. (1); Utah (1.3); Wash. (3). O and I unknown.
Ustilago bullata Berk. (*U. lorentziana* Thuem.), head smut. Wis. and Iowa to Utah and Wash. (1); Calif., Oreg., Wash. (2,3); Utah (3,4); Calif. (4); Idaho, Kans. (5).
U. hordei (Pers.) Lagh., head smut. Calif. (5).
U. hypodytes Amer. auths., ?(Schlecht.) Fr. (*?U. spegazzinii* Hirsch.), flag smut. Wash. (3).
U. sitanii G.W Fisch., loose smut. Wash. (1).
U. williamsii (Griff.) Lavrov, stem smut. Utah (1).
Xanthomonas translucens (L.R.Jones, A.G.Johnson, & Reddy) Dows., bacterial spot. N.Dak. (5).

Hystrix

(1) *H. patula* Moench, bottlebrush.
(2) *H. californica* (Boland.) Kuntze

Perennials of moist woodlands: (1) ranging from the Atlantic coast to the Mississippi Valley, of minor forage value, occasionally grown for ornament; (2) in the coastal area of California.

Cercospora sp., Ell. & Gall., leaf spot. Ill. (1).
Claviceps purpurea (Fr.) Tul., ergot. Ind., Iowa (1).
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail, choke. Mich., Minn., Mo., Wis. (1).
Fusarium nivale (Fr.) Ces., pink snow mold. Wash. (1).
Helminthosporium sativum Pam., King, & Bakke, root rot. Minn. (1).
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. General (1).
Piricularia parasitica Ell. & Ev., ? leaf spot, ? parasitic on *Phyllachora*. Wis. (1).
Puccinia glumarum (Schm.) Eriks. & E. Henn. (II,III), stripe rust. Idaho (1), Calif. (2).
P. graminis Pers. (II,III), stem rust. Minn. Natural infection with f. sp. *secalis* and *tritici* recorded.
P. montanensis Ell. (II,III), brown stripe rust. Iowa.
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Ind., Iowa, Ky., Mich., Minn., Mo., N.Y., Va., Wis. (1). The vars. *agropyrina* (Eriks.) Arth., *apocrypta* (Ell. & Tracy) Arth., and especially *impatientis* (Arth.) Mains have been identified.
Septoria microspora Ell. & Ev. (=*S. passerinii?*), leaf blotch. Ind. (1).
S. nodorum Berk., glume blotch. Minn. (1). *S. passerinii* Sacc., leaf blotch. Minn. (1).
Ustilago striiformis (West.) Niessl, stripe smut. Kans. (1).

Imperata, satintail

Imperata spp.

Perennial grass of open woods, old fields, and waste ground of the Far South and tropical America.

Phyllachora oxyspora Starb., tar spot. P.R. on *I. contracta* (H.B.K.) Hitchc.
Puccinia kaernbachii (P.Henn.) Arth. (II), rust. Ariz. O and I unknown. On *I. hookeri* Rupr.

Koeleria

(1) *K. cristata* (L.) Pers., prairie June grass.
(2) *K. phleoides* (Vill.) Pers., annual Koeleria.

Perennial bunchgrass of prairies and plains throughout the Western States, occasional in East and South, (1); or European annual (2), introduced for forage trials and locally established in the Gulf and Pacific Coast States; useful to wildlife.

Cercosporella herpotrichoides Fron, foot rot. Wash. (1).
Claviceps purpurea (Fr.) Tul., ergot. Ariz., Idaho, Iowa, Kans., Okla., Wis. (1).
Curvularia geniculata (Tracy & Earle) Boed., secondary root rot. Mont., Wash. (1).
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail, choke. Minn., N.Dak., Nebr., Pa., S.Dak., Wis. (1).
Erysiphe graminis DC., powdery mildew. Wash. (1).
Fusarium equiseti (Cda.) Sacc., secondary root rot. N.Dak. (2).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr.—N.Dak. (1).
F. nivale (Fr.) Ces., pink snow mold. Idaho, Oreg., Wash. (1).
Helminthosporium avenae Eidam, leaf blotch. S.Dak., Wash. (1).
Heterosporium avenae Eidam, leaf mold. Wash. (1).
Pseudomonas coronafaciens (Elliott) F. L. Stevens, halo blight. Minn., N. Dak. (1).
Puccinia conspicua (Arth.) Mains (II,III), rust. Colo. (1). O and I on *Dugaldea hoopesii* (Gray) Rydb.
P. coronata Cda. (II, III), crown rust. Wyo. (1).
P. glumarum (Schm.) Eriks. & E. Henn. (II, III), stripe rust. Wash. (1).
P. graminis Pers. (II, III), stem rust. Calif., Kans., Mich., N. Dak., Nebr., Oreg., S. Dak., Wash., Wis. (1). Natural infection with f. sp. *avenae* Eriks. & E. Henn. and var. *phlei-pratensis* (Eriks. & E. Henn.) Stakman & Piemeisel recorded.
P. koeleriae Arth. (II, III), leaf rust. N. Dak. to N. Mex., Calif., and Wash. O and I on *Berberis fendleri* Gray, *Mahonia aquifolium* (Pursh) Nutt., and *M. repens* (Lindl.) Don.
P. liatridis (Webber) Bethel (II, III), rust. Colo., N. Dak., N. Mex., S. Dak., Wis. (1). O and I on *Liatris* spp.
P. monoica (Pk.) Arth. (II, III), rust. Calif., Colo., N. Mex., Oreg., Wash., Wyo. (1). O and I on *Arabis* spp. and other Cruciferae.
P. stipae Arth. (II, III), rust. Colo. O and I on various Compositae.
Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, secondary root rot. Minn., N. Dak., Nebr., S. Dak. (1).
Rhizoctonia solani Kuehn, secondary root rot. Minn., N. Dak. (1).
Scolecotrichum graminis Fckl., brown stripe. Mont., N. Dak., Oreg., Wyo. (1).
Selenophoma donacis (Pass.) Sprague & A. G. Johnson var. *stomaticola* (Baeumler) Sprague & A. G. Johnson, leaf and stem speckle. N. Dak. to Wyo. and Wash. (1).

Septoria calamagrostidis (Lib.) Sacc. f. sp. *koeleriae* (Cocc. & Mor.) Sprague, leaf spot. N. Dak. to Oreg. and Wash., also Ariz., Colo. (1); *S. quinqueseptata* Sprague—N. Dak., Wash. (1).
Urocystis agropyri (Preuss) Schroet., flag smut. Ariz., Oreg. (1).
Ustilago striiformis (West.) Niessl, stripe smut. Oreg. (1).
BENDS—cause unknown. Mich., Wash. (1).

Lagurus

L. ovatus L., harestailgrass.

Annual, of Mediterranean region, sometimes cultivated for ornament and escaped in a few localities in California and North Carolina.

Puccinia coronata Cda. (II, III), crown rust.
P. graminis Pers. (II, III), stem rust. Natural infection recorded, ? Wash.

Lamarckia

L. aurea (L.) Moench, goldentop.

Annual, of Mediterranean region, cultivated for ornament, locally established in waste ground, California to Texas.

Puccinia coronata Cda. (II,III), crown rust. Calif. Experimentally shown susceptible to 5 specialized races.
P. graminis Pers. (II,III), stem rust. Calif. Experimentally shown susceptible to f. sp. *avenae* Eriks. & E. Henn. and var. *phlei-pratensis* (Eriks. & E. Henn.) Stakman & Piemeisel; also to *P. montanensis* Ell., *P. poarum* Niels., and *P. rubigo-vera* (DC.) Wint. vars. *dispersa* (Eriks.) Carl. and *tritici* (Eriks. & E. Henn.) Carl.
MOSAIC—suspected virus. Iowa.

Lasiacis

Lasiacis spp.

Perennial grasses with branching, woody culms, prostrate or clambering; in tropical America.

Angiopsora lenticularis Mains (II,III), rust. P.R. Especially on *L. divaricata* (L.) Hitch. O and I unknown.
Cephaleuros virescens Kunze, green scurf. P.R.
Dimeriella fumagina (Dearn. & Barth.) F.L.Stevens, black mildew. P.R.
Meliola panici Earle, black mildew. P.R.
Phyllachora graminis (Pers. ex Fr.) Fckl. (*?P. lasiacis* Syd.), tar spot. Mo. *P. lasiacis* Syd.—P.R. On *L. divaricata* and *L. sorghoidea* (Desv.) Hitch. & Chase.
Physalospora bambusae (Rabh.) Sacc., on stems. P.R.
Uromyces costaricensis Syd. (II,III), rust. P.R. on *L. divaricata* and *L. sorghoidea*. O and I unknown.

Leersia

(1) *L. oryzoides* (L.) Swartz, rice cutgrass.
(2) *L. virginica* Willd., whitegrass.
(3) Other species.

Perennial grasses typically in marshes and moist meadows: (1) ranging nearly throughout the U.S. except the Great Plains; (2) in the Central and Eastern States and southward; (3) in the Gulf States; important food plants of wildlife.

Cladotrichum leersiae Atk., leaf blotch. Wis. (1); Ala. (2).
Dactylaria graminum (Schw.) Sacc. (*Piricularia* ?), leaf spot. N.H. (1).
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail, choke. N.Y. (1).
Helminthosporium giganteum Heald & Wolf, leaf spot. Md. (2). *H. leersiae* Atk. (published as *H. leersii*)—Ala., Conn., Md. (2).
Metasphaeria leersiae (Pass.) Sacc. (*Sphaerella leersiae* Pass.), on leaves. N.Y. (1).
Mycosphaerella sp. (*Sphaerella zizaniae* (Schw.) Ell. & Ev.), on leaves. Wis. (1).
Piricularia grisea (Cke.) Sacc., leaf spot. Wis. (1,2).
Ramularia sp., leaf spot. La. (on *L. hexandra* Swartz).
Scolecotrichum graminis Fckl., brown stripe. N.Y. (1).
Tilletia corona Scribn., bunt. Md., Mo., Va., Wis. (1); Ill., Ind., Iowa, Md., Miss., Ohio, Wis. (2); Miss., Tex., Wis. (on *L. lenticularis* Michx.).
Tolyposporium globuligerum (Berk. & Br.) Ricker, smut. Ala., Tex. (on *L. hexandra*).
Uromyces halstedii DeT. (II,III), rust. Del., Ill., Ind., Md., Mich., Ohio, Pa., S.Dak., Tex. (1); Ala., Iowa, La., Md., Wis. (2). O and I on *Trillium* spp.

Leptochloa, sprangletop

(1) *L. dubia* (H.B.K.) Nees, green sprangletop.
(2) *L. filiformis* (Lam.) Beauv., red sprangletop.
(3) *L. virgata* (L.) Beauv., tropical sprangletop.

Perennial (1,3) or annual (2) grasses: (1) ranging from southern Florida to Arizona and Oklahoma, of minor forage value and sometimes used for hay; (2) a weed in gardens and fields chiefly in the South Central States to Florida and California; (3) in the Far South; some species useful to wildlife.

Phyllachora leptochloae Chardon, tar spot. C. Z. (3).
Physalospora tucumanensis Speg. (*Colletotrichum falcatum* Went.), on leaves. La. (2).
Puccinia bartholomaei Diet. (II,III), rust. Tex. (1), Okla. (2). O and I on *Asclepias* spp.
P. leptochloae Arth. & Fromme (II,III), rust. Tex., P.R. (2). O and I unknown.
Ustilago heterogena P.Henn., stem smut. Ariz., N.Mex. (2); also on *L. scabra* Nees in La.
U. ornata Tracy & Earle, seed smut. Miss. (2).

Leptoloma

L. cognatum (Schult.) Chase, fall-witchgrass.

Perennial of sandy fields ranging from New England to the Mississippi Valley and Gulf of Mexico; of some forage value, also a weed in cultivated ground.

Cercospora fusimaculans Atk., leaf spot. Wis.
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Okla.
Mycosphaerella sp., on culms. Okla.
Phyllachora punctum (Schw.) Orton, tar spot. Tex., Wis.
Puccinia atra Diet. & Holw. (II,III), rust. Tex. O and I unknown.
P. imposita Arth. (II,III), rust. Ala., Kans., N.Mex., Okla., Tex. O and I unknown.

Limnodea

L. arkansana (Nutt.) L.H.Dewey, Ozark grass.

Annual grass of dry plains, Florida to Texas and Oklahoma.

Puccinia coronata Cda. (II,III), crown rust. Okla.
P. graminis Pers. (II,III), stem rust. Okla.

Lolium

(1) *L. multiflorum* Lam., Italian ryegrass.
(2) *L. perenne* L., English ryegrass.
(3) *L. temulentum* L., darnel.

Short-lived perennial (1,2) or annual (3) grasses of Europe: (1) widely used for turf (sown as a winter annual) in the South and on the Pacific coast; (2) cultivated for forage and becoming naturalized in waste ground in the North; (3) a weed in grainfields chiefly in the Far West but occasionally in the Central States and East; useful to wildlife.

Ascochyta desmazierii Cav., leaf blotch. Calif., Oreg., Wash. (1,2); Ky. (1).
A. graminicola Sacc. var. *brachypodii* Trail, white leaf spot. Oreg. (2).
Cladosporium graminum Pers. ex Lk., leaf mold. Oreg. (1,2).
Claviceps purpurea (Fr.) Tul., ergot. Calif., Okla., Oreg., Wash. (1,2); Ky. (1); Idaho, Kans., Md., Mich., Minn., Nebr., S.Dak., Va., W. Va. (2). Sometimes causes poisoning of livestock in pastures.
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Oreg. (1,2); Wash. (1); Pa. (2); Tex. (3).
Diplodina lolii Zimm.: SEE *Ascochyta desmazierii*.
Fusarium culmorum (W.G.Sm.) Sacc., also var. *leteius* Sherb., root rot. Oreg. (1).
F. nivale (Fr.) Ces., pink snow mold. Wash. (2).
Gibberella ? *zeae* (Schw.) Petch, root rot. Pa. (2).
Helminthosporium sativum Pam., King, & Bakke, root rot. Oreg. (1,2); Minn. (2).
H. siccans Drechs., leaf blight. Md., N.J., Oreg., Va. (1,2); Ky. (1); Ohio (2).
H. teres Sacc. (=*Pyrenophora teres* (Died.) Drechs.), leaf spot. Md. (2).
Heterosporium sp., secondary leaf spot. Oreg. (1,2).
Leptosphaeria sp. (*L. lolii* Syd.?), associated with *Ascochyta*. Oreg. (1,2); Pa., Tex. (2).
Ovularia lolii Volk., leaf spot, eyespot. Oreg. (2).
Phialea temulenta Prill. & Del., blind seed disease. Oreg. (2,3).
Phytophthora cactorum (Leb. & Cohn) Schroet., leaf rot. Oreg. (2).
Pratylenchus sp., root nematode. Oreg. (2).
Pseudomonas coronafaciens (Elliott) F.L.Stevens var. *atropurpurea* (Reddy & Godkin) Stapp, chocolate spot. Oreg. (1,2); Wash. (2).
Puccinia coronata Cda. (II,III), crown rust. Calif., Fla., Ky., La., Okla., Oreg., Tex., Wash. (1); Ala., Ariz., Calif., Ky., Oreg., Pa., S.C., Utah, Wash. (2).
P. glumarum (Schm.) Eriks. & E. Henn. (II,III), yellow stripe rust. Oreg., Wash. (2).
P. graminis Pers. (II,III), stem rust. N.Y. (1,2); Oreg. (1); Mich., Minn., Pa. (2). The var. *phlei-pratensis* (Eriks. & E.Henn.) Stakman & Piemeisel identified in N.Y.
P. montanensis Ell. (II.III), brown stripe rust. Mich.
Rhizoctonia solani Kuehn (sometimes reported, as *Rhizoctonia* sp.) root rot, brown patch. Cosmopolitan but not frequent (1,2).
Rhynchosporium orthosporum Caldwell. scald. Oreg. (1,2). *R. secalis* (Oud.) J.J.Davis—Oreg. (1,2).
Scolecotrichum graminis Fckl., brown stripe. Oreg. (1,2). Somewhat resistant.
Septoria loligena Sprague, leaf spot. Calif. (1). *S. tritici* Rob. ex Desm. var. *lolicola* Sprague & A.G.Johnson, leaf blotch. Oreg. (1,2).
Titaea sp., leaf mold. Oreg. (1,2).
Typhula sp., snow mold. Pa. (2).
Ustilago sp. (?*U. lolii* Magn.), head smut. Oreg. (1); Ala. (3).
U. striiformis (West.) Niessl, stripe smut. Oreg. (2).
BENDS (hairpin)—cause unknown. Wash. (2).

Lycurus

L. phleoides H.B.K., wolftail.

Perennial of plains and foothills in Colorado to Texas and Arizona, and southward; an import forage grass.

Ustilago lycuroides Griff., seed smut. Ariz.

Manisuris

Manisuris spp.

Perennials of moist habitats in pine woods and open ground chiefly of the Gulf Coastal Plain and southward, occasionally to New Jersey and Missouri; of limited forage value.

Phyllachora quadraspora Tehon, tar spot. Miss. (on *M. rugosa* (Nutt.) Kuntze).
Puccinia levis (Sacc. & Bizz.) Magn. (II,III), rust. P.R. O and I unknown.
Stagonospora maritima Syd., leaf spot. Tex.

Melica, melicgrass, oniongrass

(1) *M. bulbosa* Geyer, oniongrass.
(2) *M. imperfecta* Trin., California melicgrass.
(3) *M. porteri* Scribn., Porter melicgrass.
(4) *M. subulata* (Griseb.) Scribn., Alaska oniongrass.
(5) Other species.

Perennial grasses of plains, open woodlands, and mountain meadows, chiefly in the Rocky Mountain and Pacific Coast States (2 species in the Central and Eastern States and southward); the western species of minor forage value, also useful to wildlife.

Claviceps cinerea Griff., ergot. Ariz. (5).
Dilophospora alopecuri Fr., twist. Wyo. (1).
Epichloë typhina (Pers. ex Fr.) Tul., choke. Wash. (1).
Erysiphe graminis DC., powdery mildew. Calif. (5).
Puccinia graminis Pers. (II,III), stem rust. Calif. (1,5).
P. montanensis Ell. (II,III), brown stripe rust. Calif. (2). O and I on *Berberis fendleri*.
P. paradoxica Ricker (II,III), rust. Mich. (5). O and I unknown.
P. pygmaea Eriks. (II,III)—Calif. (4).
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Calif. (5).
P. schedonnardi Kell. & Swing. (II,III), rust. Colo. (3); Ind., ?Miss. (5).
Scolecotrichum graminis Fckl., brown stripe. Oreg., Utah (1); Idaho, Wash. (4); Calif., Wyo. (5).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, leaf speckle. Calif. (5).
Septoria melicae Pass., leaf spot. N.Dak. (5). *S. nodorum* Berk., leaf spot. Calif. (5).
Spermospora subulata (Sprague) Sprague, leaf blast. Wyo. (1,5), Oreg. (4), Wyo. (5).
Urocystis agropyri (Preuss) Schlecht., flag smut. Ariz., Calif. (2).
Ustilago spegazzinii Hirsch. (*U. hypodytes* of Amer. auths.), stem smut. Calif. (1), Wash. (5).
BENDS (hairpin)—cause unknown. Wash. (5).

Milium

M. effusum L., American milletgrass.

Tall succulent perennial of moist woodlands in the Northeastern and Great Lakes States; of minor forage value.

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Mich.
Erysiphe graminis DC., powdery mildew. Mich.
Puccinia graminis Pers. (II,III), stem rust. Mich., Wis. The f. sp. *avenae* Eriks. & E.Henn. identified.
P. pygmaea Eriks. (II,III), leaf rust. Wis.
Scolecotrichum graminis Fckl., brown stripe. N.Y.

Molinia

M. caerulea (L.) Moench, moorgrass.

Perennial introduced from Europe, sparingly established in meadows in the Northeastern States; of minor forage value.

Puccinia graminis Pers. (II,III), stem rust. Natural infection recorded, Plant Dis. Rptr. Sup. 130.

Monanthochloë

M. littoralis Engelm., shoregrass.

Creeping perennial of tidal flats in Florida, Texas, and California; useful to wildlife.

Puccinia schedonnardi Kell. & Swing. (II,III), leaf rust. Tex. O and I on Malvaceae.

Muhlenbergia, muhly

I. Annual Species

(1) *Muhlenbergia filiformis* (Thurb.) Rydb., pull-up muhly.
(2) *M. texana* Buckl., Texas muhly.

Bunchgrasses of the western Plains; useful to wildlife.

Cylindrosporium calamagrostidis Ell. & Ev., on leaves. Utah (1).
Phyllosticta minutaspora Sprague, on dying leaves. Idaho (1).
Puccinia schedonnardi Kell. & Swing. (II,III), leaf rust. N.Mex., ?Utah (1).
Scolecotrichum graminis Fckl., brown stripe. Idaho (1).
Tilletia montana Ell. & Ev., seed smut. Mont. (1).
?Ustilago hyalo-bipolaris G.W.Fisch. & Hirsch., inflorescence smut. Ariz. (2). Host perhaps *M. porteri*.

II. Perennial Species, Bunchgrasses

(1) *Muhlenbergia cuspidata* (Torr.) Rydb., plains muhly.
(2) *M. montana* (Nutt.) Hitchc., mountain muhly.
(3) *M. pauciflora* Buckl., New Mexican muhly.
(4) *M. porteri* Scribn., bush muhly.
(5) *M. torreyi* (Kunth.) Hitchc., ringgrass.

Mostly western species except (1), which occurs throughout the North Central States and northern Plains, (3) and (4) only in the Southwest; valuable for forage.

Curvularia geniculata (Tracy & Earle) Boed., secondary root rot. N.Dak. (2).
Fusarium spp., secondary root rot: *F. equiseti* (Cda.) Sacc.—N.Dak. (2); *F. oxysporum* Schlecht.—N.Dak. (2).
Helminthosporium sativum Pam., King, & Bakke, root rot. N.Dak. (2).
Phyllachora coloradensis Orton, tar spot. Colo. (2). *P. vulgata* Th. & Syd.—Ind. to Nebr., Wyo., and N. Dak., also N.Mex. (1); Ariz., Colo. (2); Ariz., N.Mex. (4).
Puccinia graminis Pers. (II,III), stem rust. Iowa, Nebr. (1).
P. schedonnardi Kell. & Swing. (II,III), leaf rust. Iowa, N.Dak., Nebr., S.Dak. (1); Colo., N.Mex., Utah (2); Ariz. (4); Colo. (5).
Selenophoma everhartii (Sacc. & Syd.) Sprague & A.G. Johnson, leaf speckle. N.Dak. (1).
Ustilago bethelii Zundel, leaf smut. Ariz., Colo. (2).
U. coloradensis Zundel—Colo. (5).
U. hyalino-bipolaris G.W.Fisch. & Hirsch., inflorescence smut. Ariz., N.Mex. (4).
U. muhlenbergiae P.Henn.—N.Mex. (3).

III. Perennial Species

(1) *Muhlenbergia asperifolia* (Nees & Mey.) Parodi, alkali muhly, scratchgrass.
(2) *M. mexicana* (L.) Trin., wirestem muhly.
(3) *M. racemosa* (Michx.) B.S.P., marsh muhly.
(4) *M. schreberi* Gmel., nimblewill.
(5) *M. squarrosa* (Trin.) Rydb., mat muhly.
(6) *M. sylvatica* Torr., forest muhly.
(7) Other species.

Perennial grasses, mostly of creeping or spreading habit, often in moist alkaline waste ground or in woodlands: (1) and (5) in the Western States; (2), (4), and (6) in the Central and Eastern States; and (3) throughout the United States except the Southeast. Some are of minor forage value or furnish food for wildlife.

Ascochyta graminicola Sacc., leaf spot. Wis. (7).
Cercospora muhlenbergiae Atk., leaf spot. Ala. (2,4); N.Dak. (3); Wis. (3,6); Nebr. (7).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Okla. (4).
Curvularia geniculata (Tracy & Earle) Boed., leaf mold. N.Dak. (7).
Didymella culmigena Sacc., on dead culms. Miss. (2).
Entyloma crastophilum Sacc., leaf smut. Utah (1).
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail, choke. Iowa (7).
Erysiphe sp., powdery mildew. Md. (7).
Fusarium equiseti (Ces.) Sacc., secondary root rot. N.Dak. (7).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr.—N.Dak. (3); Nebr. (7).
F. poae (Pk.) Wr.—Minn. (3).
Helminthosporium sp., leaf blotch. Minn. (1); Va. (7). *H. cynodontis* Marig., leaf mold. Fla. (2). *H. giganteum* Heald & Wolf, leaf spot. Md. (2,4,7). *H. halodes* Drechs., secondary root rot, seed mold. N.Dak. *H. sativum* Pam., King, & Bakke, root rot. Wis. (2).
Leptosphaeria muhlenbergii Rehm, on culms. N.Dak. (3). *L. sporoboli* Ell. & Gall.—Mont. (5).
Macrophomina phaseoli (Maubl.) Ashby, charcoal stem rot. Ind. (2); Va. (4).
Mycosphaerella sp. (*Sphaerella muhlenbergiae* Ell.), on leaves. N.J. (?2).
Phaeoseptoria festucae Sprague, leaf spot. Mich. (2,3).
Phleospora muhlenbergiae Sprague & Solheim, leaf spot. Ariz. (1).
Phyllachora epicampis Orton, tar spot. Ariz., Calif. (on *M. rigens* (Benth.) Hitchc.). *P. texensis* Orton

—Tex. (on *M. reverchoni* Vasey & Scribn.). *P. vulgata* Th. & Syd.—Recorded on all the listed species, and others, throughout the U.S.
Piricularia grisea (Cke.) Sacc., leaf spot. Kans. (7).
Pleospora permunda Cke., on dead culms. N.Mex. (7).
Puccinia epicampis Arth. (II,III), leaf rust. Calif., N.Mex. (on *M. rigens*). O and I unknown.
P. graminis Pers. (II,III), stem rust. Iowa, Mo. (1,2).
P. luxuriosa Syd., rust. Mont. (1).
P. schedonnardi Kell. & Swing. (II,III), leaf rust. Recorded on all the listed species, and others, throughout the U.S. O and I on Malvaceae.
Pythium arrhenomanes Drechs., root browning. N.Dak. (3).
Rhizoctonia solani Kuehn, root rot. Minn., S.Dak. (3).
Scirrhia sporoboli Atk., on dead culms. Okla. (1).
Scolecotrichum graminis Fckl., brown stripe. Iowa (2); Wis. (3).
Selenophoma everhartii (Sacc. & Syd.) Sprague & A.G. Johnson, leaf speckle. N.Dak. (3).
Septogloeum oxysporum Sacc., Bomm., & Rouss., char spot. N.Dak. (1).
Septoria mississippiensis Sprague, leaf spot. N.Dak. (1); Minn. (2).
Sphacelotheca montaniensis (Ell. & Holw.) Clint., inflorescence smut. Mont., N.Dak. (1).
Stagonospora graminella Sacc., on leaves. N.Mex. (7).
Tilletia asperifolia Ell. & Ev., seed smut. Mont. to N.Mex., Nev., and Wash. (1).
Uromyces epicampis Diet. & Holw. (II,III), rust. Ariz. (on *M. rigens*). O and I unknown.
U. ignobilis (Syd.) Arth. (II,III)—Tex. (on *M. reverchoni*). O and I unknown.
U. minimus J.J.Davis—Oreg., Wash. (3); Wis. (6); Oreg. (7). O and I unknown.
Ustilago hyalino-bipolaris G.W.Fisch. & Hirsch., inflorescence smut. Ariz. (7).
U. pseudohieronymi Zundel, leaf smut. Colo. (5).
U. striiformis (West.) Niessl, stripe smut. Calif. (7).
BENDS (hairpin)—cause unknown. Wash. (3).

Munroa

M. squarrosa (Nutt.) Torr., false-buffalograss.
Annual mat-forming grass of the western Plains; useful to wildlife.

Cercospora sp., leaf spot. Colo., Kans.

Olyra

O. latifolia L., carricillo.
Bamboo-like woody perennial of tropical America.

Angiopsora phakopsoroides (Arth. & Mains) Mains (II,III), rust. P.R.
Dimeriella fumagina (Dearn. & Barth.) F.L.Stevens, black mildew. C.Z., P.R.
Meliola panici Earle, black mildew. C.Z., P.R.
Puccinia deformata Berk. & Curt. (II,III), rust. P.R.

Oplismenus

(1) *O. hirtellus* (L.) Beauv. (*Panicum variegatum* of florists), basketgrass.
(2) *O. setarius* (Lam.) Roem. & Schult.
Prostrate perennials of tropical America: (1) cultivated for ornament; (2) occurring along the Atlantic and Gulf coasts to North Carolina and Texas; useful to wildlife.

Meliola panici Earle, black mildew. P.R. (1).
Phyllachora punctum (Schw.) Orton, tar spot. Fla., La., S.C., P.R. (1,2).
Puccinia inclita Arth. (II,III), rust. P.R. (1).
Uredo paspalicola P.Henn. (II) (=*Angiopsora compressa* Mains?), rust. P.R. (1).

Oryza

O. sativa L., rice.
Annual of East Indian origin, cultivated throughout the tropics and warm regions; grown commercially in the United States in Louisiana, Arkansas, Texas, and California, and on a smaller scale in Mississippi, Missouri, South Carolina, Hawaii, and Puerto Rico.

Alternaria sp. (*A. tenius* Nees ex Cda.?), kernel discoloration, glume mold. Ark., Calif., La.
Ascochyta oryzae Catt., on glumes. Va.
Aspergillus spp., kernel discoloration—occasional. Seedling blight. Tex.
Balansia oryzae (Syd.) Narasimhan & Thirum., black ring, sterility disease. La.
Cercospora oryzae I. Miyake, narrow brown spot, glume spot. Ala., Ark., La., Tex., P.R. Prominent on Blue Rose and Early Prolific varieties; different physiological races on other varieties.
Chaetomium spp., kernel discoloration. Occasional.
Cladosporium herbarum Pers. ex Lk., kernel discoloration. Occasional.
Corticium sasakii (Shirai) T.Matsu., sheath spot, banded sclerotial disease, seedling root rot. Ark., La., Tex. Conforms in description to *Pellicularia* but has not been definitely so placed. SEE ALSO *Rhizoctonia* and *Sclerotium*.
Curvularia spp., kernel discoloration, glume mold: *C. brachyspora* Boed.—Tex.; *C. falcata* (Tehon) Boed.—P.R.; *C. lunata* (Wakk.) Boed.—Ark., La., Tex.; *C. maculans* (Bancroft) Boed.—Ark., La., Tex. A seedling blight is sometimes also ascribed to *C. lunata*.
Entyloma oryzae H. & P. Syd., leaf smut. Ark., La., Tex.
Ephelis oryzae: SEE *Balansia oryzae*.
Epicoccum neglectum Desm., kernel discoloration. Cosmopolitan.
Fusarium spp., kernel discoloration—cosmopolitan; seedling blight, foot rot. Ark., La., P.R. *F. moniliforme* Sheldon is commonly present but is of doubtful primary pathogenicity; no races producing the ascigerous stage *Gibberella fujikuroi* (Saw.) Wr. (*G. moniliformis* Wineland) or causing bakanae (stem-elongation) disease have been reported in the U.S. *F. semitectum* Berk. & Rav. (=*F. roseum* Lk. emend Snyd. & Hans.) was associated with a dry rot of grain reported in Tex.
Helicoceras oryzae Linder & Tullis, kernel discoloration, sheath rot (?secondary). Ark., La., Tex.
Helminthosporium oryzae B. de Haan, brown spot, seedling blight, "pecky" rice. Ark., Calif., Fla., La., Miss., Tex., P.R. Conidial stage of *Ophiobolus miyabeanus* Ito & Kuribay., but the latter has not been identified in the U.S. *H. oryzae* Miyabe & Hori is synonymous.
H. sigmoideum Cav.: SEE *Leptosphaeria salvinii*. A form described as var. *irregulare* Cralley & Tullis, said to lack a perithecial stage and therefore not referable to *L. salvinii*, is reported as causing stem rot in Ark., La., and Tex.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Heterosporium ?avenae Oud., leaf mold. Calif., Tex.
Leptosphaeria salvinii Catt., stem rot. Ark., Calif., La., Tex.
Meloidogyne sp., root knot nematodes. Ark., La., Tex.

Monascus purpureus Went, kernel discoloration, red kernel. Occasional.
Mycosphaerella oryzae (Catt.) I. Miyake, on sheaths, ?leaf spot. Tex.
Neovossia horrida (Tak.) Padwick & Khan, kernel smut. Southeastern and Gulf States; first reported in S.C., now rare or absent there, present chiefly in La. and Tex.
Nigrospora oryzae (Berk. & Br.) Petch, kernel discoloration, secondary sheath rot. Ark., La., Tex.
Ophiobolus miyabeanus Ito & Kuribay.: See *Helminthosporium oryzae.*
O. oryzae I. Miyake, on dead culms. La.
O. oryzinus Sacc., black sheath rot, foot rot. Ark., La., Tex.
Penicillium spp., blue mold of grain. Ark.
Phoma sp., kernel discoloration. Ark., La., Tex.
P. glumicola Speg., on culms. La.
P. necatrix Thuem.—Ark., Calif., Tex. Also reported as *Phyllosticta necatrix* (Thuem.) I. Miyake.
Phyllosticta glumarum (Ell. & Tracy) I. Miyake, brown-bordered leaf spot, glume spot. Ark., La., Miss., Tex.
P. japonica I. Miyake—S. C.
Piricularia oryzae Cav., blast, rotten neck, seedling blight. General. Some authorities regard this as only a specialized race of *P. grisea* (Cke.) Sacc. with which it is morphologically identical.
Pleosphaerulina oryzae I. Miyake, on discolored glumes. Va.
Podoconis sp., kernel discoloration. ?La.
Pratylenchus pratensis (De Man) Filip., root nematode. Ark.
Protascus colorans Wolk (*Wolkia decolorans* (Wolk) Ramsb.), kernel discoloration, yellow grain. Ark., Calif.
Pyrenochaeta oryzae Shirai ex I. Miyake, on sheaths and glumes. Ark.
Pythium spp., root-tip rot. Ark., La. *P. graminicola* Subr.—T.H. *P. rostratum* Butl.—Calif.
P. nagaii Ito & Tokunaga, leaf and sheath rot of seedlings. Ark.
Rhizoctonia spp., sheath spot, stem rot, seedling blight. General—reported in Ark., Calif., La., Tex. Present confusion in the identity and nomenclature of the various "sclerotial diseases" of rice precludes precise discrimination. In the U.S. the following fungi referable in the sterile state to *Rhizoctonia* are reported on rice: *R. oryzae* Ryker & Gooch, bordered sheath spot; *R. solani* Kuehn, sheath spot, stem rot, and seedling blight; and *R. zeae* Voorhees, sheath spot. Banded sheath spot is attributed to *Corticium sasakii* (?*Rhizoctonia grisea* (Stevenson) Matz). *R. oryzae* is perhaps a synonym of *R. zeae.* Based on similarity to some strains of *R. solani,* all of these may belong to *Pellicularia* but only *R. solani* has been so placed. See also *Corticium, Helminthosporium, Leptosphaeria,* and *Sclerotium.*
Sclerotium irregulare Miyake: See *Corticium sasakii.*
S. oryzae Catt.: See *Leptosphaeria salvinii.*
S. rolfsii Sacc. (*Pellicularia rolfsii* (Curzi) E.West), seedling blight. La., Tex.
Septoria oryzae Catt., on glumes. Fla.
Tilletia horrida: See *Neovossia horrida.*
Trichochonis caudata (Appel & Strunk) Clements, kernel discoloration, pink kernel. Ark., La., Tex.
Trichoderma viride Pers. ex Fr., secondary sheath spot. Ark., La., Tex.
Ustilaginoidea virens (Cke.) Tak., false smut. Calif., Ga., La., S.C., Tex., P.R.
Chlorosis—physiological (associated with alkaline soil) or genetic (albinism). La., Tex., P.R.
"Dwarf"—cause unknown but not virus dwarf of the Orient. Tex.
"Mosaic"—cause unknown, ?virus. La.
Straighthead (sterility)—physiological; occurs typically in new fields, rich in organic matter, when first flooded, and is counteracted by drainage; attributed to suboxidation and toxicity of nitrites. Gulf States, Calif.
White tip—physiological (?). Usually occurs in alkaline soils and may be associated with magnesium deficiency; has also been attributed to root damage by nematodes, *?Aphelenchoides oryzae* Yokoo.

Oryzopsis, ricegrass

(1) *O. asperifolia* Michx., roughleaf ricegrass.
(2) *O. hymenoides* (Roem. & Schult.) Ricker, Indian ricegrass.
(3) *O. micrantha* (Trin. & Rupr.) Thurb., littleseed ricegrass.
(4) Other species.

Perennial grasses: Mostly indigenous to the western Plains and typically in arid regions (2,3,4); (1) in dry open woods from the Northeastern to the Northern Rocky Mountain States; one species, *O. miliacea* (L.) Benth. & Hooker, introduced from Europe, is sometimes cultivated. All are minor forage grasses and wildlife-food plants; (2) also used as a cereal by the aborigines.

Asterina graminicola Ell. & Ev. (*Dimerina* sp.), on leaves. Mich. (1).
Balansia epichloë (Weese) Diehl, black ring, sterility disease. Pa. (1).
Claviceps sp. (*?C. purpurea* (Fr.) Tul.), ergot. Wis. (4).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. N.Dak. (3).
Fusarium spp., secondary root rot. N.Dak. (2). *F. equiseti* (Cda.) Sacc., *F. oxysporum* Schlecht., *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr. (also on (2) in Wash.), *F. sporotrichioides* Sherb., recorded.
F. nivale (Fr.) Ces., snow mold. Calif. (2).
Helminthosporium sativum Pam., King, & Bakke, root rot. N.Dak., Wash. (2).
Hendersonia simplex Schroet., on culms. N.Dak. (1).
Lophodermium arundinaceum (Schrad. ex Fr.). Chev., on dead leaves and culms. Wash. (4).
Mycosphaerella sp. (*Sphaerella oryzopsidis* Ell. & Ev.), on leaves. Mich. (1).
Phyllachora oryzopsidis (Rehm) Th. & Syd., tar spot. Mass., Mich., Minn., N.Y., Vt., Wis. (1).
Puccinia burnettii Griff., (II,III), rust. Calif., Colo., Mont., Nev., Utah, Wyo. (2). O and I on *Eurotia lanata.*
P. micrantha Griff. (II,III)—Colo., Mont., Nebr., S.Dak. (3). O and I on Grossulariaceae.
P. pygmaea Eriks. (II,III)—Mich., Wis. (1). O and I on *Berberis* sp. in Europe.
P. scaber (Ell. & Ev.) Barth. (II,III)—Mont. to N.Mex., Calif., and Wash. (2). O and I unknown.
P. stipae Arth. (II,III)—Ariz., Calif., Colo., Wash. (2). O and I on Compositae.
Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, pink root. N.Dak. (1,2).
Pythium arrhenomanes Drechs., root browning. N.Dak. (2). *P. debaryanum* Hesse, root necrosis. N.Dak. (2,4). *P. graminicola* Subr.—Wash. (2).
Rhizoctonia solani Kuehn, secondary root rot. N.Dak. (2).
Scolecotrichum graminis Fckl., brown stripe. Utah, Wash., Wyo. (2).

Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, stem speckle. Calif., Mont., N.Dak., Oreg., Utah. (2).
Stagonospora arenaria Sacc., brown blotch. Mont. (2).
Ustilago hypodytes (Schlecht.) Fr., stem smut. Ariz., Calif., Idaho, Nev., Wash. (2).
U. minima Arth.—Ariz., Calif., Colo., N.Mex. (2).
U. nummularia Speg.—Colo., Idaho, Mont., Nev., Okla., Oreg., Utah, Wash., Wyo. (2).
U. williamsii (Griff.) Lavrov—Mont., Utah, Wyo. (2); Wash. (4).
Wojnowicia graminis (McAlp.) Sacc. & D.Sacc., leaf mold. N.Dak. (2).
BENDS—cause unknown. Mont., Wash., Wyo. (2).

Panicum[6]

I. Subgenus *Dichanthelium*, Dichotoma and Related Groups

(1) *Panicum boscii* Poir
(2) *P. clandestinum* L.
(3) *P. commutatum* Schult.
(4) *P. latifolium* L.
(5) *P. scribnerianum* Nash
(6) Other species.

Perennial grasses characterized by winter rosettes of short leaves and upright spring and summer growth; usually in damp woodlands mainly in the Eastern, Southern, and Central States, rarely west to the Plains and the Pacific coast; useful chiefly to wildlife.

Balansia strangulans (Mont.) Diehl (*Dothichloë nigricans* (Speg.) Chardon), black ring, whiptail. N.Y., Pa., Va. (2); Fla. (3); Nebr. (5); N.Y. to Fla., Miss., and Kans. (6).
Cercospora fusimaculans Atk., leaf spot. Wis. (5,6); Ala., Okla., Oreg. (6). *C. panici* J.J.Davis.—Wis. (1,4).
Cladosporium piricularioides Dearn. & House, leaf spot. N.Y. (6).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Wis. (6).
Dimeriella fumagina (Dearn. & Barth.) F.L. Stevens, sooty mold. P.R. (4).
Helminthosporium flagelloideum Atk., leaf spot. Ala. (6). *H. giganteum* Heald & Wolf—Md. (2).
Meliola panici Earle, black mildew. P.R. (4,6).
Metasphaeria panicorum (Cke.) Sacc., on leaves. Ga., S.C. (3); N.H. (6). *M. punctulata* Ell. & Ev., on dead culms. Ga. (2,3).
Naemacyclus culmigenus Ell. & Langl., on culms. Fla. (6).
Ophiobolus acuminatus (Sow. ex Fr.) Duby, on dead culms. Ga. (2). *O. brachyascus* (Wint.) Sacc.—N.J. (6).
Phyllachora punctum (Schw.) Orton, tar spot. General, reported on the species named and others in this group from N.H. to Fla., Tex., and Wis.; also in Calif. (on *P. pacificum* Hitchc. & Chase).
Puccinia emaculata Schw. (II,III), rust. Tenn. (3). O and I unknown.
Septoria sp. (? *S. graminum* Desm.), leaf spot. Mich. (1); Md., Okla. (2); Nebr. (5); Wis. (5,6).
S. tandilensis Speg.—Wis. (6).
Tetraploa divergens Tracy & Earle, leaf spot. N.C. (1,4).
Uromyces graminicola Burr. (II,III), rust. Mo. (6).

II. Subgenus *Eupanicum*, Capillaria Group

(1) *Panicum capillare* L., witchgrass; including var. *occidentale* Rydb., cushion witchgrass.
(2) *P. miliaceum* L., proso, broomcorn-millet.
(3) Other species.

Coarse annual grasses: (1) occurring throughout the United States, the typical form mostly east of the Plains, the var. *occidentale* westward to the Pacific coast; of minor forage value when young, but chiefly a weed in cultivated ground; (2) introduced from Europe, cultivated for forage and seed and sometimes escaped, chiefly in the Northeastern and North Central States.

Ascochyta graminicola Sacc., leaf spot. Wis. (1).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Iowa, Minn. (2).
Curvularia geniculata (Tracy & Earle) Boed., seedling blight. N.Dak. (2).
Ellisiella caudata (Pk.) Sacc., on leaves. N. Mex. (3).
Fusarium spp., secondary root rot: *F. equiseti* (Cda.) Sacc., *F. oxysporum* Schlecht., *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr.—N.Dak., S.Dak., (1,2); *F. poae* (Pk.) Wr.—N.Dak. (1); *F. sporotrichioides* Sherb.—N.Dak. (1); ? *F. bulbigenum* Cke. & Mass.—Calif. (2).
Helminthosporium sp., leaf spot. Idaho, Iowa, Minn. (1); N.J., Tex. (2); N.Dak. (1,3).
H. giganteum Heald & Wolf, zonate eyespot. Md. (3).
H. halodes Drechs., secondary root rot. Minn., N.Dak., S.Dak. (2).
H. monoceras Drechs., leaf spot. N.Dak. (2).
H. sativum Pam., King, & Bakke, root rot. N.Dak., Wis. (1).
H. turcicum Pass., secondary root rot. N.Dak. (2).
?Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. N.H., Tex. (1); N.Dak. (3). Orton does not list any *Phyllachora* on *Panicums* of this group.
Piricularia grisea (Cke.) Sacc., leaf spot. Del., Ill., Minn., Ohio (2).
Pseudomonas syringae v. Hall (*P. holci* Kendr.), bacterial eyespot. N.Dak. (1,2).
Puccinia emaculata Schw. (II,III), rust. Mass. to Miss., Okla., and N.Dak. (1); Ind. (2,3); N.H. (3). O and I unknown.
Pythium spp., root necrosis: *P. arrhenomanes* Drechs.—N.Dak. (2); *P. graminicola* Subr.—Iowa (2); *P. monospermum* Pringsh.—N.Dak. (2).
Rhizoctonia solani Kuehn, secondary root rot. N.Dak. (1).
Sclerospora graminicola (Sacc.) Schroet., downy mildew. Iowa (2).
Septoria arechavaletae Wint., leaf spot. Va. (1).
Sorosporium syntherismae (Pk.) Farl., loose smut. Mass. to Ind., Kans., and Idaho (1); Ariz. (3).
Sphacelotheca destruens (Schlecht.) Stevenson & A.G. Johnson (*S. panici-miliacei* (Pers.) Bub.), head smut. General, reported from Md. to Mo., Calif., and Wash. (2).
Stagonospora curvula Bomm. & Rouss., leaf spot. Tex. (3).
Tilletia pulcherrima Ell. & Gall., seed smut. Pa. (1).
Xanthomonas panici (Elliott) Săvul., bacterial stripe. Calif., Minn., Mont., Oreg., S.Dak., Wis. (2).

[6] Relatively few of the many species of *Panicum* have any economic importance, but even those having some utility for grazing, soil-erosion control, or as food plants for wildlife are too numerous to list individually. They are therefore arranged in groups as in Hitchcock's Manual of the Grasses of the United States, though not all the groups are represented; in each group the principal species are listed alphabetically and others are provided for in a general category. In some instances records pertaining to particular species not listed in the group headings are specifically identified.

III. Fasciculata and Related Groups

(1) *Panicum dichotomiflorum* Michx., fall panicum.
(2) *P. fasciculatum* Swartz, browntop-millet.
(3) *P. texanum* Buckl., Texas-millet.
(4) Other species.

Coarse annuals, usually in moist ground, often weeds in cultivated fields: (1) throughout the Eastern and Central States; (2,3) chiefly in the South from North Carolina to Arizona; useful to wildlife.

Ascochyta sp., leaf rot (?secondary). N.Dak. (1).
Cercospora fusimaculans Atk., leaf spot. Iowa (1).
Entyloma speciosum Schroet. & P.Henn., leaf smut. Ill., Ind., La., Md. (1).
Fusarium scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. Nebr. (1).
Helminthosporium giganteum Heald & Wolf, leaf spot. Md. (1).
?Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Tex. (3).
Phyllosticta sorghina Sacc., leaf spot. Fla. (1).
Piricularia grisea (Cke.) Sacc., leaf spot. Tex. (3).
Puccinia circumdata Mains (II,III), rust. C.Z., P.R. (2). O and I unknown.
P. huberi P.Henn. (II,III)—P.R. (2,4); V.I. (4).
P. substriata Ell. & Barth. (II,III)—Tex. (3).
Pythium arrhenomanes Drechs. and *P. rostratum* Butl., root rot. T.H. (2).
Sclerospora graminicola (Sacc.) Schroet., downy mildew. Tex. (1).
Sorosporium syntherismae (Pk.) Farl., loose smut. Mass. to Miss., Nebr., and Wis. (1).
?Uromyces leptodermus Syd. (II,III), rust. C.Z. (1); Tex. (3).
Ustilago togata Liro, seed smut, smut gall. Ill., Ind., Iowa, Kans., Md., Miss., N.J., N.Y., Nebr. (1).
?U. rabenhorstiana Kuehn, inflorescence smut. Pa. (1).
Mosaic—virus (? *Marmor sacchari* Holmes, Saccharum virus 1 K.M.Sm.). La. (1).

IV. Maxima Group

(1) *Panicum maximum* Jacq., Guinea grass.
(2) *P. bulbosum* H.B.K., including var. *minus* Vasey, bulb panicum.
(3) Other species.

Coarse perennial grasses: (1) native of Africa, now established throughout tropical America and in southern Florida and Texas, cultivated for forage; (2) in moist habitats in the Southwestern States, useful for forage and sometimes cut for hay.

Cercospora fusimaculans Atk., leaf spot. C.Z. (1).
Claviceps purpurea (Fr.) Tul., ergot. P.R. (1).
Coniothyrium panici Syd., leaf spot. P.R. (1).
Helminthosporium sp., leaf spot. Fla. (1).
Himantia stellifera Johnston, on culms, ? collar rot. P.R. (1.3).
Otthia panici F. L. Stevens, on dead culms. P.R. (1).
Phyllachora punctum (Schw.) Orton, tar spot. Ariz. (3).
Phyllosticta panici E. Young, (=*P. sorghina* Sacc. ?), leaf spot. Fla., P.R. (1).
Puccinia atra Diet. & Holw. (II,III), rust. Ariz. (2,3); N.Mex. (2). O and I unknown.
P. huberi P. Henn. (II,III)—P.R. (1). O and I unknown.
Uromyces graminicola Burr. (II,III), rust. Ala., Fla. (1).

V. Obtusa and Related Groups

(1) *Panicum obtusum* H.B.K., vine-mesquite.
(2) *P. gymnocarpon* Ell., Savannah panicum.
(3) *P. hemitomum* Schult., maidencane.

Stoloniferous perennials of moist or subaquatic habitats: (1) ranging from Missouri to Texas and Arizona, of minor forage value and a good soil binder; (2) and (3) in the Southern and Southeastern States, (3) also near the Atlantic coast to New Jersey; useful to wildlife.

Balansia strangulans (Mont.) Diehl, black ring, whiptail. Fla. (3).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Fla., La. (3).
Griphosphaerella stevensonii Petr., on leaves. Fla. (3).
Metasphaeria punctulata Ell. & Ev. and *M. stenotheca* Ell. & Ev., on dead culms. La. (3).
Myriogenospora bresadoleana P.Henn. (=*M. paspali* Atk.?), black crust. Fla. (3).
Nigrospora oryzae (Berk. & Br.) Petch, leaf and glume mold. Fla. (3).
Ovularia sp., leaf streak. Fla. (3).
Phyllachora wilsonii Orton, tar spot. Okla., N.Mex. (1).
Physalospora oxystoma Ell. & Sacc., on dead culms. La., Miss. (3).
Tilletia pulcherrima Ell. & Gall., seed smut. Ariz. (1).
Venturia erysiphioides Ell. & Ev., on culms, La. (3).

VI. Purpurascentia and Related Groups

(1) *Panicum purpurascens* Raddi (*P. barbinode* Trin.), Para grass.

Coarse perennial of Africa (?), cultivated for forage throughout tropical America; also established in moist ground and marshes in the Gulf States and occasionally elsewhere; useful to wildlife.

(2) Other species.

Helminthosporium sp., leaf spot. Fla. (1).
Marasmius sacchari Wakk., on culms, ?collar rot. P.R. (1).
Myriogenospora paspali Atk., black crust, tangle-top. Fla. (1).
Nigrospora oryzae (Berk. & Br.) Petch, leaf mold. P.R. (1).
Perisporium zeae Berk. & Curt., sooty mold. Fla. (1).
P. zeae Desm., probably distinct, has priority.
Phyllachora chardonii Orton, tar spot. Fla., P.R. (on *P. geminatum* Forsk.).
Pythium arrhenomanes Drechs. and *P. rostratum* Butl., root rot. T.H. (1).
Uromyces leptodermus Syd. (II,III), rust. Fla., Tex., P.R., C.Z., V.I. (1).

VII. Virgata and Related Groups

(1) *Panicum virgatum* L., switchgrass.
(2) *P. agrostoides* Spreng., redtop panicum.
(3) *P. anceps* Michx., beaked panicum.
(4) *P. laxum* Swartz
(5) *P. longifolium* Torr., longleaf panicum.
(6) Other species.

Perennial grasses: (2,3,5) in moist habitats in the Gulf and Atlantic Coastal Plain; (4) in tropical America; (1) in open woods and prairies extending to the Great Plains, of minor forage value and sometimes cut for hay; others useful to wildlife.

Ascochyta sp., leaf spot. N.Dak. (1).
Balansia epichloë (Weese) Diehl, black ring, whiptail. Mo. (2).
B. henningsiana (Moell.) Diehl—Ky., Va. (1); Miss. (2,3); Mo. (3); Va. (6).
Cercospora fusimaculans Atk., leaf spot. N.Dak. (1); Wis. (1,6).
Cerebella panici Tracy & Earle (=*C. paspali* Cke. & Mass.?), on inflorescences associated with conidial stage of ergot. Miss. (1).
Claviceps sp., ergot. Miss. (1).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Ala., Kans., La., Minn., Wis. (1).
Curvularia geniculata (Tracy & Earle) Boed., secondary leaf spot. Kans., Nebr. (1).
Dothichloë: See *Balansia.*
Exarmidium fusariisporum (Ell. & Ev.) Th. & Syd., on dead culms. Kans. (1).
Fusarium equiseti (Cda.) Sacc., and *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak., Nebr. (1).
Helminthosporium giganteum Heald & Wolf, zonate eyespot. Md. (3).
H. sativum Pam., King, & Bakke, root rot. Nebr. (1).
Hendersonia panicicola Petr., on culms. N.Dak. (1).
Hysterographium graminis Ell. & Ev., on culms. Kans. (1).
Leptostromella panici Dearn., on leaves. S.C. (6).
Metasphaeria subseriata Ell. & Ev., on culms. Kans. (1).
Myriogenospora paspali Atk., black streak, tangle-top. Va. (3).
Phyllachora cornispora Atk., tar spot. Ala. (2,5), Ga. (2,3), Ill. (2).
P. congruens Rehm—N.J. (5), Ala. (6).
P. graminis (Pers. ex Fr.) Fckl.—N.Y. to N.C., Kans., and Wis. (1).
P. guianensis F. L. Stevens—P.R. (4).
Phyllosticta panici E. Young (=*P. sorghina* Sacc.?), leaf spot. Okla. (1).
Puccinia coronata Cda. (II,III), crown rust. Mass. (2).
P. graminis Pers. (II,III), stem rust. ?Kans. (1). Natural infection recorded without locality in Plant Dis. Rptr. Sup. 130.
P. panici Diet. (II,III), leaf rust. Conn. to Ala., Tex., and S.Dak. (1); N.C., Va. (6). O and I on Euphorbiaceae.
Pythium arrhenomanes Drechs., root rot. N.Dak. (1).
P. debaryanum Hesse, damping-off. Nebr. (1).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson, leaf and culm spot. Kans., N.Dak., Wis. (1).
Septoria spp., leaf spot: reported as *S. graminum* Desm. (probably not this but *S. tandilensis* Speg., ? *S. arechavaletae* Wint.)—Wis. (1,6).
S. sigmoidea Ell. & Ev. (*Hendersonia crastophila* Sacc.?)—Iowa, Wis. (1).
Sorosporium syntherismae (Pk.) Farl., seed smut. Wis. (1); Mo. (2).
Tetraploa divergens Tracy & Earle, leaf spot. Miss. (2).
Tilletia maclagani (Berk.) Clint., seed smut. Conn., Ill., Iowa, Kans., N.Y., Nebr. (1).
T. pulcherrima Ell. & Gall.—Ariz., Ill., Iowa, Kans., Miss., Nebr., Okla. (1).
Uromyces graminicola Burr. (II,III), leaf rust. Conn. to Fla., N.Mex., and S.Dak. (1); Fla., Va. (6). O and I on Euphorbiaceae.
Ustilago togata Liro, seed smut, smut gall. Tex. (1).
U. underwoodii Zundel, leaf smut. N.Y. (1).
Bends (hairpin)—cause unknown. Wis. (1).

Paspalum

I. Dilatata Group

(1) *Paspalum dilatatum* Poir, Dallis grass, water paspalum.
(2) *P. urvillei* Steud., Vasey grass.

Tall perennial grasses: (1) native of South America, extensively grown for forage in the Gulf States and locally naturalized in prairies and low meadows from New Jersey to Florida and Texas, and sparingly in the Southwest; (2) native of tropical America, grown in the Gulf States and California for pasture and hay, the panicles also used for small brooms.

Cerebella paspali Cke. & Mass., on inflorescences (associated with ergot). Ala., La.
Cladosporium sp., head mold (associated with ergot). La., Tex.
Claviceps paspali F.L.Stevens & J.G.Hall, ergot, Md. to Fla., Tex., and Okla., also Calif., P.R., and T.H. (1); Va. to Fla. and La (2). A source of bovine stock poisoning in pastures after prolonged use.
Colletotrichum graminicola (Ces.) G.W.Wills., anthracnose. Fla., Ga. (1).
Fusarium spp., head mold, scab (usually associated with ergot). General (1,2). Commonly reported as *F. heterosporum* Nees, sometimes *F. graminum* Cda. and *F. avenaceum* (Fr.) Sacc. (all=*F. roseum* Lk. emend Snyd. & Hans.
Helminthosporium sp., leaf spot. Fla. (2).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H. (2).
Phyllachora sp., tar spot. Miss. (1).
Phyllosticta sp., leaf spot. S.C. (1).
Puccinia levis (Sacc. & Bizz.) Magn. (II,III), rust. Fla., Ga., La., Miss., Tex. (2). O and I unknown.
Sorosporium paspali McAlp., head smut. T.H. (1).
Stagonospora paspali Atk., on necrotic leaves. Ga., N.C., Tex. (1).

II. Disticha—Notata Groups

(1) *Paspalum distichum* L., knotgrass.
(2) *P. notatum* Flügge, Bahia grass.
(3) *P. pubiflorum* Rupr., hairy-seed paspalum, including var. *glabrum* Vasey.
(4) *P. vaginatum* Swartz, seashore paspalum.
(5) Other species.

Creeping or low perennial grasses of moist or wet habitats and often saline or alkaline soil: (1) and (4) near the Atlantic and gulf coasts and (1) also occasionally inland and on the Pacific coast, valuable for erosion control; (3) in the southern Mississippi Valley; (4) native of tropical America, sparingly introduced in the Gulf States, a good forage grass; useful to wildlife.

Claviceps paspali F.L.Stevens & J.G.Hall, ergot. General (*). *Cladosporium* sp. and *Fusarium* sp. often associated.
Cuscuta sp., dodder. Tex. (3).
Curvularia sp., leaf mold. Fla. (2).
Fusarium heterosporum Nees, head mold, scab. Fla., La. (1).
Helminthosporium sp., leaf spot. Fla. (2).
Phyllachora cornispora Atk., tar spot. Fla. (1); P.R. (2). *P. wilsonii* Orton—Tex. (3).
Sphacelotheca panici-notati (P.Henn.) Clint., head smut. P.R. (5).
Ustilago schroeteriana P. Henn., seed smut. Fla. (1).

III. Miscellaneous Species

(1) *Paspalum boscianum* Flügge, bull paspalum.

(2) *Paspalum ciliatifolium* Michx., fringe-leaf paspalum.
(3) *P. conjugatum* Bergius, sour paspalum.
(4) *P. laeve* Michx., field paspalum.
(5) *P. plicatulum* Michx., brown-seed paspalum.
(6) *P. stramineum* Nash, sand paspalum.
(7) *P. virgatum* L., talquezal.
(8) Other species.

Mostly perennial grasses, except (1) annual; usually in moist open ground or in woodlands; chiefly in the Southern or Southeastern States and tropical America, except (6) in the Central States; several furnish useful forage; some (1,3) are weeds in cultivated ground; all useful to wildlife.

Alternaria sp., leaf spot. Tex. (5).
Angiopsora compressa Mains (II, rarely III), rust. Fla., C.Z. (3); P.R. (3,5,8); Tex. (8). O and I unknown.
Balansiopsis pilulaeformis (Berk. & Curt.) Diehl, black crust. Fla., Ga., Va. (2,8).
Cercospora paspali Ray, leaf spot. Okla. (6,8).
Chaetospermum tubercularioides (Pat.) Sacc., on dead culms. Fla. (2).
Claviceps paspali F.L.Stevens & J.G.Hall, ergot. Widespread, reported on (2,4,5,?7,8) through their range.
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. P.R. (5); Okla., Wis. (6).
Curvularia sp., leaf mold. Fla. (8).
Fusarium sp., root rot. Tex. (5).
F. heterosporum Nees, head mold. P.R. (5,8); C.Z. (7); Fla., La. (8).
Helminthosporium sp., leaf spot. Fla. (8).
H. mayaguezense Miles—P.R. (3).
H. micropus Drechs., leaf spot, seedling blight. Fla. (1).
H. rostratum Drechs., leaf spot. Ga. (1).
Himantia stellifera Johnston, on rhizomes, ?collar rot. P.R. (5,7,8).
Meliola panici Earle, black mildew. P.R. (8).
Myriogenospora paspali Atk. (*M. bresadoleana* P. Henn.), black streak, tangle-top. Va. (2); P.R. (3); Ala. (4).
Phyllachora congruens Rehm, tar spot. P.R. (3).
P. cornispora Atk.—Ala., Fla. (4); C.Z., P.R. (4,7,8); Tex. (8).
P. guianensis F.L.Stevens—Fla. (2); La. (4); C.Z. (5,8); P.R. (7).
P. paspalicola P.Henn.—C.Z. (3,5); P.R. (3); Fla. (8).
P. wilsonii Orton—Ala., Fla., Ga. (2); Nebr., Okla., Tex., Wis. (6); Md. to Ala., N.Mex., and Mo. (8).
Physoderma paspali Stevenson, leaf streak. P.R. (5).
Piricularia grisea (Cke.) Sacc., leaf spot. Ala., Fla., Kans. (5,8).
Puccinia atra Diet. & Holw. (II,III), rust. P.R. (on *P. laxum* Lam.). O and I unknown.
P. chaetochloae Arth. (II,III)—Fla., Okla. (on *P. floridanum* Michx.); P.R. (8). O and I unknown.
P. coronata Cda. (II,III), crown rust. Tex. (on *P. setaceum* Michx.).
P. dolosa Arth. & Fromme (II,III)—C.Z., P.R. (5,8). O and I unknown.
P. emaculata Schw. (II,III)—Okla. (6).
P. levis (Sacc. & Bizz.) Magn. (II,III)—T.H. (3); P.R. (5,8); La. (7); V.I. (8). O and I unknown.
P. substriata Ell. & Barth. (II,III), rust. Va. to Fla., Tex., and Nebr.; recorded on (2,3,5,6,7 and other species), but in some of the reports this is confused with *Angiopsora compressa, P. chaetochloae,* and *P. dolosa.* Authentic records exist for (2) in Fla., Tex.; for (3) and (7) in P.R.; for (6) in Kans., Nebr., Okla., and Va. O and I on noncultivated *Solanum* spp.
Sorosporium paspali McAlp., head smut. T.H. (8).
Sphacelotheca paspali-notati (P.Henn.) Clint., head smut. Fla., P.R. (8).
Stagonospora paspali Atk., leaf spot. Ala. (4), N.C. (8).
Tilletia rugispora Ell., seed smut. La., Tex. (5).
Ustilago schroeteriana P.Henn., seed smut. ?Miss., C.Z., P.R. (8).
MOSAIC—virus (*Marmor sacchari* Holmes, Saccharum virus 1 K.M.Sm.). Fla., Ga. (1).

Pennisetum

(1) *P. glaucum* (L.) R.Br., pearl millet.
(2) *P. alopecuroides* (L.) Spreng., Chinese pennisetum.
(3) *P. purpureum* Schumach., Napier grass, elephantgrass.

Annual (1) or perennial (2,3) grasses of Old World (1,2) or African (3) origin: (1) long in cultivation for grain but in the southern United States grown chiefly as a forage and soiling crop; (2) sometimes cultivated for ornament.

Curvularia sp., leaf mold. Ga. (1,3).
Gloeocercospora sorghi D. Bain & Edg., leaf spot. Ga. (1).
Helminthosporium giganteum Heald & Wolf, leaf spot. Md. (2).
H. rostratum Drechs., zonate eyespot. Ga. (1).
H. sacchari (B. de Haan) Butl., eyespot. Fla., Ga. (3); T.H. (1,3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H. (3).
Pseudomonas syringae v. Hall, bacterial spot. Iowa (3).
Tylenchus spiralis Cassidy, root nematode. T.H.
Ustilago penniseti Rabh., seed smut. Va. (2).
LEAF MOTTLE—cause unknown but presumed of genetic origin because of transmission through seed. P.R. (3).
MOSAIC—virus (*Marmor sacchari* Holmes, Saccharum virus 1 K.M.Sm.). Ga. (1).

Phalaris, canarygrass

I. Perennial Species

(1) *Phalaris arundinacea* L., reed canarygrass.
(2) *P. arundinacea* var. *picta* L., ribbongrass.
(3) *P. californica* Hook. & Arn., California canarygrass.
(4) *P. tuberosa* L., bulb canarygrass, especially the var. *stenoptera* (Hack.) Hitchc., Harding grass, "Peruvian" wintergrass.

Tall perennials of moist habitats, native (1,3) or introduced from the Mediterranean region (2,4): (1) occurs throughout the northern United States and is an important constituent of lowland wild hay; (2) is cultivated for ornament; (3) occurs near the coast in California and Oregon, has been introduced recently as a forage grass, useful to wildlife.

Ascochyta graminicola Sacc. var. *brachypodii* Trail, leaf spot. N.Dak. (1).
Cladosporium graminum Pers. ex Lk., leaf mold. Oreg. (4).

Claviceps purpurea (Fr.) Tul., ergot. Maine to Va., Okla., and Mont. (1); N.Y. (2).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Wash. (1)
Erysiphe graminis DC., powdery mildew. Wash., Wis. (1).
Fusarium equiseti (Cda.) Sacc. and *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., root rot. N.Dak. (4).
Helminthosporium sp., leaf spot. Minn., N.C (1).
H. giganteum Heald & Wolf, zonate eyespot. Md. (2).
H. sativum Pam., King, & Bakke, leaf spot. Md., Wis. (1); Oreg. (4).
Heterosporium avenae Oud., leaf mold. Nebr. (1).
Ovularia hordei (Cav.) Sprague, leaf spot. N.Dak., S.Dak., Wis., Wyo. (1).
Phaeoseptoria phalaridis (Trail) Sprague, leaf mold. Oreg. (1,4).
Phyllachora phalaridis Orton, tar spot. Miss. (1).
Puccinia coronata Cda. (II,III), crown rust. Wash. (1).
P. graminis Pers. (II,III), stem rust. Calif. (1,3); N.Y. (1). The f. sp. *avenae* Eriks. & E.Henn has been identified.
P. sessilis Schneid. (II,III), leaf rust. N.Y. to Ind., Colo., and Oreg. (1); Calif. (3); Oreg. (4). O and I on *Iris versicolor* L. and various Liliaceae.
Pythium debaryanum Hesse, root rot. N.Dak. (1).
Rhizoctonia solani Kuehn, secondary root rot. Oreg. (4).
Rhynchosporium secalis (Oud.) J.J.Davis, scald. Mont., N.Dak., S.Dak., Wyo. (1).
Sclerotium ? *rhizodes* Auers., leaf rot. Wis. (1).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson, leaf spot. N.Dak., Wash. (1).
Septoria bromi Sacc. var. *phalaricola* Sprague, leaf spot. Oreg., Wash. (1).
Stagonospora foliicola (Bres.) Bub., buff spot. Ky., Iowa, Minn., N.Dak., S.Dak., Wis. (1); Calif. (3).
Ustilago echinata Schroet., leaf smut. Mich., N.Dak., Nebr., S.Dak., Wash. (1).
U. spegazzinii Hirsch. var. *agrestis* (Syd.) G.W.Fisch. & Hirsch., stem smut. Wash. (1). Formerly reported as *U. hypodytes* (Schlecht.) Fr.
U. striiformis (West.) Niessl, stripe smut. Maine (1).
BENDS (hairpin)—cause unknown. Utah (1).

II. Annual Species

(1) *Phalaris canariensis* L., canarygrass.
(2) *P. caroliniana* Walt., Carolina canarygrass.
(3) Other species.

Annuals of Mediterranean region (1) or native (2,3): (1) sparingly naturalized in waste ground throughout the Eastern and Central States, also cultivated for birdseed; (2,3) in moist lowlands in the Southeastern States to the Pacific coast; useful to wildlife.

Cladosporium velutinum Ell. & Tracy (=*C. graminum* Pers. ex Lk.?), leaf mold. Miss. (1).
Claviceps purpurea (Fr.) Tul., ergot. Mich., Minn. (1).
Puccinia coronata Cda. (II,III), crown rust. (1,2). Natural infection recorded in Plant Dis. Rptr. Sup. 130.
P. glumarum (Schm.) Eriks. & E.Henn., stripe rust. Calif. (3).
P. graminis Pers. (II,III), stem rust. Tex. (2); Okla. (2,3). The f. sp. *avenae* Eriks. & E.Henn. identified.
P. sessilis Schneid., leaf rust. Calif. (2), Okla. (3).

Phleum, timothy

I. Perennial Species

(1) *Phleum alpinum* L., alpine timothy.
(2) *P. pratense* L., common timothy.
(3) Other species.

Meadow grasses: (1) native, chiefly in New England and mountain meadows in the West: (2) native of temperate North America or of Eurasian origin and introduced but now widely naturalized, the principal cultivated hay grass, grown in all humid regions except the South.

Ascochyta phleina Sprague, leaf spot. Minn. (2).
Cladosporium graminum Pers. ex. Lk., leaf and head mold. Calif. (1); N.Y. (2).
C. herbarum Pers. ex Lk.—Minn. (2).
Claviceps purpurea (Fr.) Tul., ergot. Maine to Ky. and Minn., also Oreg., Wash., Alaska. Sometimes reported as *C. microcephala* (Wallr.) Tul., doubtfully distinct.
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Vt. to N.J., Mo., and Minn. (2).
Curvularia sp., leaf mold. Mo. (2).
Diaphorthe arctii (Lasch) Nits., on dead cums. N.J. (2).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y.
Endoconidium temulentum Prill. & Del., blind seed disease. Oreg. (2). Conidial stage of *Phialea temulenta* Prill. & Del.
Entyloma crastophilum Sacc., leaf smut. Ill., Iowa, Wis. (2).
Epichloë typhina (Pers. ex Fr.) Tul., choke, cat-tail. Iowa, Maine, Nebr., Pa. (2).
Erysiphe graminis DC., powdery mildew. Minn., Pa. (2).
Fusarium heterosporum Nees, head mold, probably following ergot. Minn., W.Va., Wis. (2).
F. nivale (Fr.) Ces., snow mold. Wash. (2).
F. poae (Pk.) Wr., silver-top, leaf spot. Ind., Iowa, Minn., N.Y. (2).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., also *F. equiseti* (Cda.) Sacc., secondary root rot. N.Dak. (2).
Gloeosporium meinersii Sprague, leaf spot. Wash. (2).
Helminthosporium sp., leaf spot. Conn., Minn., Mo. (2).
H. giganteum Heald & Wolf, zonate eyespot. Md. (2).
H. sativum Pam., King, & Bakke, leaf spot, root rot. Wash. (2).
H. triseptatum Drechs., leaf spot. Md., Va. (2).
H. victoriae Meehan & Murphy, on seed. Iowa (2).
Hendersonia sp., leaf mold. Minn. (2).
Heterosporium phlei Greg., purple spot. Calif. (1); New England to Ky. and Minn., also Ariz., Calif., Colo., Idaho, Oreg., Wash., Wyo. (2).
Leptosphaeria culmifraga (Fr.) Karst., on culms. N.J. (2).
L. vagans Karst., on dead culms. Calif. (1).
Lophodermium arundinaceum (Schrad. ex. Fr.) Chev. var. *gramineum* Duby, on leaves. N.J., Ohio, Va. (2).
L. phlei Tehon & Stout—N.J. (2).
Macrophoma phlei Tehon & Stout (=*Sphaeropsis phlei* Ell. & Ev?), on leaves, ?blight. Ill. (2).
Ophiobolus graminis Sacc., take-all. Idaho, N.Y. (2).
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Maine (2).
Physalospora oxystoma Sacc. & Ell., on dead culms. N.J.
Pratylenchus pratensis (De Man) Filip., root nematode. Ky. (2).
Puccinia coronata Cda. (II,?III), crown rust. Iowa, W.Va. (2—resistant).
P. graminis Pers. var. *phlei-pratensis* (Eriks. & E.Henn.) Stakman & Piemeisel (II,III), stem rust. General (2); Calif., Wash. (3.) Natural infection of (2) by the f. sp. *avenae* Eriks. & E. Henn. is also recorded.
P. poae-sudeticae (West.) Jørst. (II,III), leaf rust. Colo. (1). O and I unknown.

Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, pink root. Minn., N.Dak. (2).
Pythium graminicola Subr., root necrosis. Wash. (2).
Rhizoctonia solani Kuehn, root rot. N.Dak. (2).
Rostrosphaeria phlei Tehon & Daniels, on leaves. Ill. (2).
Sclerotium ?rhizodes Auers., leaf rot. Mass., Wis. (2).
Scolecotrichum graminis Fckl., brown stripe. General (2).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson, leaf speckle. N.Dak., Alaska (2). Var. *stomaticola* (Baeumler) Sprague & A.G.Johnson—Colo. (2).
Septoria sp., leaf spot. Ill., Pa. (2).
Sirrococcus phlei Tehon & Daniels, on culms. Ill. (2).
Sphaeropsis phlei Ell. & Ev., on leaves. N.J., Va. (2).
Stagonospora subseriata (Desm.) Sacc., leaf mold. Minn. (2).
Stemphylium botryosum Wallr., seed mold. N.Y. (2).
Urocystis agropyri (Preuss.) Schroet., flag smut. Mo., N.H., Pa., Vt. (2).
Ustilago spegazzinii Hirsch. var. *agrestis* (Syd.) G.W.Fisch. & Hirsch., stem smut. Wash. (2,3).
U. striiformis (West.) Niessl, stripe smut. General (2).
Xanthomonas translucens (L.R.Jones, A.G.Johnson, & Reddy) Dows. f. sp. *phlei-pratensis* Wallin & Reddy, bacterial stripe. Iowa, Minn., Wis. (2).
BENDS (hairpin)—cause unknown. Idaho, Wash. (2).
VIRESCENCE (leafy proliferation of florets)—cause unknown. Conn., Ind., Va. (2).

II. Annual Species

(1) *Phleum graecum* Boiss. & Heldr.
(2) *P. paniculatum* Huds.
(3) *P. phleoides* (L.) Karst.

Introduced grasses: (1) and (2) from the Mediterranean region, (3) from Brazil; under test in grass nurseries.

Fusarium nivale (Fr.) Ces., pink snow mold. Wash. (3).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., root rot. N.Dak. (3).
Heterosporium phlei Greg., leaf spot. Wash. (3).
Puccinia graminis Pers. (II,III), stem rust. Wash. (1,3), Oreg. (2), Calif. (3).

Phragmites

P. communis Trin., common reed.

Robust perennial growing in shallow water and marshes throughout the United States; the culms used for matting, thatching, and cordage by the Indians, the seed an important source of food for wildlife.

Claviceps purpurea (Fr.) Tul., ergot. Iowa, N.J., Okla. *Coniosporium arundinis* (Cda.) Sacc.: SEE *Papularia.*
Graphyllium dakotense Rehm, and *G. graminis* (Ell. & Ev.) Rehm, on dead culms. N.Dak.
Hendersonia arundinacea (Desm.) Sacc., on leaf sheaths and culms. N.Dak., Tex. *H. grantii* Dearn —Wash. SEE ALSO *Stagonospora.*
Leptosphaeria culmicola (Fr.) Karst., on dead culms. Iowa.
Lophiostoma arundinis (Fr.) Ces. & de N., on dead culms. N.Dak.
Mycosphaerella sp. (*Sphaerella phragmitis* Ell. & Ev.), on leaves. Ind.
Napicladium arundinaceum (Cda.) Sacc., leaf spot. Minn., N.Dak., Nebr., Wis.
Neovossia iowensis Hume & Hodson, seed smut. Conn., Iowa, Md.
Papularia arundinis (Cda.) Fr., and *P. sphaerosperma* (Pers. ex Lk.) Hoehn., black mold of culms and leaves. Cosmopolitan.
Phragmopeltis phragmitis Dearn., on dead culms. Wash.
Pseudographis phragmitis Dearn. & House, on dead culms. N.Y.
Puccinia magnusiana Koern. (II,III), yellow leaf rust. Iowa, N.Dak., Nebr., S.Dak., Wis. O and I on *Anemone canadensis* L.
P. phragmitis (Schum.) Koern. (II,III), brown leaf rust. Conn. to Del., Colo., and Wash. O and I on *Rumex* spp. and *Rheum rhaponticum* L.
Pythium debaryanum Hesse, and *P. ultimum* Trow, root rot. N.Dak.
Rhopographus clavisporus (Cke. & Pk.) Sacc., on dead culms. Iowa, N.Dak., N.Y., S.Dak., Wis.
Scolecotrichum graminis Fckl., brown stripe. Oreg., Wis. *S. maculicola* Ell. & Kell., reported in Iowa, Kans., Nebr., Oreg., and Wash., may be distinct.
Selenophoma donacis (Pass.) Sprague & A.G.Johnson, leaf spot. N.Dak.
Stagonospora spp., leaf mold: *S. graminella* Sacc.—N.Dak.; *S. phragmitis* Ell. & Ev.—Ind.; *S. simplicior* Sacc. & Briard—Wis. In part the conidial stage of *Leptosphaeria arundinacea* (Sow. ex Fr.) Sacc.

Poa, bluegrass

I. Annual Species, *Poa annua* Group

(1) *Poa annua* L., annual bluegrass.
(2) *P. bigelovii* Vasey & Scribn., Bigelow bluegrass.
(3) *P. chapmaniana* Scribn., Chapman bluegrass.
(4) Other species.

Annual grasses introduced and widely established (1) or native in the West (2,4) and South (3); (1) used as a winter lawn grass in the South but elsewhere a weed; all useful to wildlife.

Claviceps purpurea (Fr.) Tul., ergot. Okla. (1).
Corticium fuciforme (McAlp.) Wakef., pink patch. Wash. (1).
Curvularia sp. (*C. geniculata* (Tracy & Earle) Boed.?), leaf mold. N.Y., Pa. (1).
Entyloma irregulare Johans., pale leaf smut. Oreg., Wash. (1).
Fusarium culmorum (W.G.Sm.) Sacc., head mold. Oreg. (1).
F. ?nivale (Fr.) Ces., snow mold. Oreg., Wash. (1).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak. (1).
Gibberella zeae (Schw.) Petch, culm rot. N.Y., Wis. (1).
Puccinia graminis Pers. (II,III), stem rust. Wis. (1); also reported without locality on (3) and in Calif. on *P. howellii* Scribn. & Vasey; sometimes listed as f. sp. *poae* Eriks. & E.Henn.
P. poae-sudeticae (West.) Jørst. (II,III), leaf rust. Calif., Del., N.Y. (1); N.Mex. (2); Oreg. (1,4).
Rhizoctonia solani Kuehn, brown patch. General in warm humid regions (1), but this host usually matures before seasonal conditions are favorable for infection.
Sclerotium sp. (=*Sclerotinia homoeocarpa* F.T.Bennett?), leaf rot. Mass. (1).
Septoria macropoda Pass., leaf blotch. Wis. (1); Oreg., Wash. (1,4).
?Sorosphaera radicalis W.R.I.Cook, in roots. Calif. (1).
Synchytrium sp., purple speck. Oreg., Wash. (1).
Ustilago striiformis (West.) Niessl, stripe smut. Mass. (1), Ky. (3). The race on this host has been designated as f. sp. *poae-annuae* W.H.Davis.

II. Perennial Species, *Poa palustris* Group

(1) *Poa trivialis* L., rough bluegrass.
(2) *P. bulbosa* L., bulbous bluegrass.
(3) *P. interior* Rydb. (*P. nemoralis* of some Amer. auths.), inland bluegrass.
(4) *P. palustris* L., fowl bluegrass.

Meadow grasses of Europe (1,2,4), or native (3): (1) is sometimes used in grass mixtures in the Northeastern and North Pacific Coast States and is occasionally escaped; (2) is sparsely and (4) widely naturalized in humid parts of the northern United States; (3) occurs at medium altitudes in the Rocky Mountains and in the North Central and Northeastern States and is locally important for forage.

Cladosporium graminum Pers. ex Lk., leaf mold. S.Dak. (4).
Claviceps purpurea (Fr.) Tul., ergot. N.Dak. (4).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. N.Dak. (4).
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail, choke. Del., N.Y. (4).
Erysiphe graminis DC., powdery mildew. Maine, Mich., Minn., N. Dak., S. Dak., Oreg., Wash., Wyo. (3,4); Colo., Utah (4).
Fusarium equiseti (Cda.) Sacc., secondary root rot. Wash. (2), N.Dak. (4).
F. ?nivale (Fr.) Ces., snow mold. Wash. (1,2,4); Idaho (2).
F. poae (Pk.) Wr., head mold. Minn. (1).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. Idaho, Wash. (2); N.Dak. (4).
Helminthosporium poae Baudyš, leaf mold. Oreg. (1).
H. sativum Pam., King, & Bakke, root rot. N.Dak. (2,4).
H. vagans Drechs.—Wash. (2).
Pleospora vagans Niessl, leaf mold. N.Dak. (4).
Pseudoplea trifolii (Rostr.) Petr., on dead leaves. N.Y. (1,4).
Puccinia graminis Pers. (II,III), stem rust. Tenn., Wis. (1); N.Dak. (2); Wash. (3,4); Ind. (4). The f. sp. *avenae* Eriks. & E.Henn. has been identified in one instance.
P. poae-sudeticae (West.) Jørst. (II,III), yellow leaf rust. Oreg., Wash. (*); Colo., Idaho (3,4); Mont., N.Y., W.Va., Wis. (4).
P. rubigo-vera (DC.) Wint. (II,III), orange leaf rust. Colo. (3).
Pythium debaryanum Hesse, damping-off. N.Dak. (2,4).
Ramularia graminicola Pk., leaf spot. N.Y. (4).
Rhizoctonia solani Kuehn, brown patch, root rot. General in warm humid regions (*).
Scolecotrichum graminis Fckl., brown stripe. Ind., Minn., N.Y., Wash. (1,3,4); Oreg. (4); Wyo. (3).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson, leaf spot, speckle. Colo. (4). Var. *stomaticola* (Baeumler) Sprague & A.G.Johnson—Mont., N.Dak., Wyo. (3).
Septoria nodorum Berk., leaf and glume blotch. S.Dak. (4).
S. oudemansii Sacc., leaf spot. Colo., N Dak. (4).
Tilletia caries (DC.) Tul., rough-spored bunt. Wyo. (on *P. reflexa* Vasey & Scribn.).
Ustilago spegazzinii Hirsch., stem smut. Wash. (4).
U. striiformis (West.) Niessl, stripe smut. Conn., W.Va. (1); S.Dak., Wash. (4).

III. Perennial Species, *Poa pratensis* Group

(1) *Poa pratensis* L., Kentucky bluegrass
(2) *P. arachnifera* Torr., Texas bluegrass
(3) *P. arida* Vasey, plains bluegrass
(4) *P. compressa* L., Canada bluegrass
(5) *P. nervosa* (Hook.) Vasey, Wheeler bluegrass
(6) Other species.

Perennial grasses with creeping rhizomes, turf-forming: (1) and (4) originally European but cultivated and naturalized throughout the humid middle and northern regions of the United States, and the principal lawn and pasture grasses there; (2) and (3) are their native counterparts in the southwestern and western plains; (5) is an important forage grass in mountain meadows in the Pacific Northwest and Rocky Mountain States.

Ascochyta graminicola Sacc., leaf spot. N.C., N.Dak., Ohio, Tex., Wash. (1).
Brachycladium spiciferum Bainier, leaf mold, ?seedling blight. N.Y. (1).
Cercosporella poagena Sprague, leaf spot. Oreg. (1).
Cladosporium graminum Pers. ex Lk., leaf and seed mold. General in humid regions (1,4). Also reported as *C. herbarum* Pers. ex Lk. and *Mycosphaerella tulasnei* (Jancz.) Lindau, perhaps all synonymous. *C. graminum* as cited antedates *C. graminum* Cda., as sometimes reported.
Claviceps purpurea (Fr.) Tul. (*C. microcephala* (Wallr.) Tul.), ergot. Northeastern and North Central States to Ky., Okla., and Mont. (1,4); N.Dak. (3); Wash. (4).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. N.Y. to Ky., Okla., and N.Dak. (1,4).
Culvularia sp. (*?C. geniculata* (Tracy & Earle) Boed.), secondary leaf spot, seed mold. N.Y., N.Dak., Va. (1,4).
Cuscuta sp., dodder. Mo. (1).
Dinemasporium graminum Lév., on fading leaves. Kans., Md., N.C. (1,4).
Entyloma crastophilum Sacc., dark leaf smut. N.Dak. (1); Oreg., Wash. (1,4). Probably only a form of the following.
E. irregulare Johans., pale leaf smut. Ill., Minn., Oreg., Pa., Va., Wash., Wis. (1); Wash. (4).
E. spragueanum Zundel—N.Dak. (1).
Epichloë typhina (Pers. ex Fr.) Tul., choke, cat-tail. Del. (1), N.Dak. (1,4).
Erysiphe graminis DC., powdery mildew. General (1); Minn., Mont., W.Va. (4); Wyo. (5).
Fusarium culmorum (W.G.Sm.) Sacc., culm rot. Wash. (1).
F. equiseti (Cda.) Sacc., secondary root rot. Minn. (4).
F. graminearum Schwabe: SEE *Gibberella zeae*.
F. heterosporum Nees, head mold, often following ergot. Ill. (1,4).
F. ?nivale (Fr.) Ces., snow mold. Idaho, Mich., Minn., Oreg., Wash. (1); Wyo. (6). Conidial stage of *Calonectria nivalis* Schaffn., but some reports in U.S. are confused with *F. culmorum* and other races or species of *Fusarium roseum* group; ascigerous stage not identified here.
F. poae (Pk.) Wr., silver-top, head blight. Iowa, Minn., N.Y., Pa., Wis. (1).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. Minn., N.Dak., Nebr., S.Dak. (1,3,4).
Gibberella zeae (Schw.) Petch, culm rot, head blight. N.Y. (1).
Gloeosporium bolleyi Sprague, seedling root rot. Wash. (1).
G. graminum Rostr., on fading leaves. Oreg. (1).
Helminthosporium giganteum Heald & Wolf, zonate eyespot. Md., Va. (1,4).
H. sativum Pam., King, & Bakke, root and culm rot. N.Dak., N.Y., Tex. (1).

Helminthosporium vagans Drechs., leaf spot, sheath rot. Northeastern, North Central, and North Pacific States (1,4); Ariz., Utah (1); N.Dak. (3).
Hendersonia calospora Fautr. (=*H. crastophila* Sacc.?), leaf mold. N.Dak. (4). *H. simplex* Schroet.—N.Dak. (1).
Lophodermium arundinaceum (Schrad. ex Fr.) Chev., on dead leaves and culms. Calif., Idaho (1); Calif. (4). Var. *culmigenum* (Fr.) Fckl.—on culms. N.J. (4).
Macrophoma oblongata Tehon, on culms. Ill. (1).
Ophiobolus graminis Sacc., take-all. N.Y. (4).
Physarum cinereum (Batsch.) Pers., slime-mold, sometimes overgrowing plants in lawns. General in humid regions (1,4).
Puccinia coronata Cda. (II,III), crown rust. Ala. (2); Kans., Mo., Pa. (4). O and I on *Rhamnus* spp.
P. graminis Pers. (II,III), stem rust. Pa. to N.C., Ill., and Wis. (1,4); N.Dak. (2); Mich., Nebr., Tex. (3); Mich. (6). Only the f. sp. *poae* Eriks. & E.Henn identified in natural infections.
P. poae-sudeticae (West.) Jørst. (II,III), yellow leaf rust. General (*). O and I unknown.
P. rubigo-vera (DC.) Wint. (II,III), orange leaf rust. Occasional, N.Y. to N.C., Calif., and Wash. (1); Mont., Nebr. (3); Mont., Utah (5). The var. *agropyri* (Eriks.) Arth. with O and I on Ranunculaceae identified.
Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, pink root. N.Dak. (1).
Rhizoctonia solani Kuehn, brown patch. General in warm humid regions (1,4).
Sclerotium sp. (*?Sclerotinia homoeocarpa* F.T.Bennett), dollar patch. Occasional in humid regions in the Eastern States, not confirmed in the West.
S. rhizodes Auers., leaf rot. Pa., Wis. (1).
Scolecotrichum graminis Fckl., brown stripe. General (1,4); Mont., N.Dak. (3).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A.G. Johns., leaf spot, speckle. Mont., N Dak., Wyo. (1,4); Wash. (1); Colo. (4); Mont., Wyo. (5,6). *S. obtusa* Sprague & A.G.Johns.—N.Dak. (3).
Septoria graminum Desm. Reports of this on *Poa* refer mostly to *S. macropoda* and its varieties.
Septoria macropoda Pass., leaf blotch. Oreg. (6). Var. *grandis* Sprague—Wyo. (1); S.Dak. (3); Mont. (4). Var. *septulata* (Gonz. Frag.) Sprague, purple leaf blotch. Maine to Va., Tenn., and the Pacific Northwest. (1); Oreg., S.Dak. (4); Wash. (5).
S. nodorum Berk., glume spot. Ark., Md., N.Dak., Ohio, Oreg., S.Dak., Wis. (1); Wash. (5).
S. oudemansii Sacc., tan leaf spot. Mich. to Ky., Nebr., Calif., and Wash. (1); N.Dak. (2); Oreg., Wash. (4).
Stagonospora intermixta (Cke.) Sacc., leaf spot. Miss. (2). *S. subseriata* (Desm.) Sacc.—Minn. (1).
Synchytrium sp., purple speckle. Oreg., Wash. (1).
Typhula itoana Imai, snow-scald. Minn., Pa. (1).
Urocystis agropyri (Preuss) Schroet., flag smut. Calif., Mich., N.H., Pa., Wash., Wis. (1).
Uromyces dactylidis Otth (*U. poae* Rabh.) (II,III), leaf rust. Ind., Mich., S. Dak., Vt. (1). O and I on *Ranunculus repens*.
Ustilago striiformis (West.) Niessl, stripe smut. General from Maine to Va., Mo., and Minn., occasional in Idaho, N.Mex., Utah, Wash. (1); Ind., Pa. W.Va. (4). The race on (1) in New England has been designated f. sp. *poae-pratensis* W.H.Davis, but f. sp. *agrostidis* W.H.Davis has also been reported in Wis.
Wojnowicia graminis (McAlp.) Sacc. & D.Sacc., leaf and seed mold. Mont., N.Dak., Wyo. (1).
BENDS (hairpin)—cause unknown. Mich. (1).

IV. Perennial Species, Miscellaneous Groups

(1) *Poa fendleriana* (Steud.) Vasey, muttongrass.
(2) *P. juncifolia* Scribn., alkali bluegrass.
(3) *P. nevadensis* Vasey, Nevada bluegrass.
(4) *P. sandbergii* Vasey (*P. secunda* of Amer. auths., ?Presl), Sandberg bluegrass.
(5) *P. scabrella* (Thurb.) Benth., pine bluegrass.
(6) Other species.

Bunchgrasses of mountain meadows and plains, mostly in the Far West, some in the North Central and at high altitudes in the Northeastern States; all useful for forage, the listed species chiefly so, when sufficiently abundant.

Ascochyta graminicola Sacc. var. *brachypodii* Trail, leaf spot. Oreg. (6).
Cercosporella herpotrichoides Fron, culm rot. Wash. (4).
Cladosporium graminum Pers. ex Lk., leaf mold. Mont. (5).
Claviceps purpurea (Fr.) Tul., ergot. Reported on (1,3,4,5,6) from N.Dak. to Colo. and Wash.
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. S.Dak., (6).
Corynebacterium agropyri (O'Gara) Burkh., bacterial spot. Nev. (4).
Dilophospora alopecuri Fr., twist disease. Utah (4).
Entyloma irregulare Johans., leaf smut. Oreg. (2); Wash. (2,6).
Epichloë typhina (Pers. ex Fr.) Tul., choke, cat-tail. N.Dak. (4), Wash. (5).
Erysiphe graminis DC., powdery mildew. General within the host ranges, reported on (2,3,4,5, and others) from N.Dak to Mo., Calif., and Wash.
Fusarium equiseti (Cda.) Sacc., secondary root rot. N.Dak. (4).
F. ?nivale (Fr.) Ces., snow mold. Oreg., Wash. (4,6), Idaho (6).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. Wash. (4).
Gloeosporium meinersii Sprague var. *alpina* Sprague, on moribund leaves. Colo. (6).
Helminthosporium sp., leaf spot. Mich. (3,6).
H. poae Baudyš—Wash. (4).
H. sativum Pam., King, & Bakke, root rot. N.Dak. (4).
H. vagans Drechs.—Idaho, Oreg. (4).
Hendersonia culmicola Sacc., leaf mold. Wash. (4). Var. *minor* Sacc.—Utah (4); Idaho, Utah (6).
Heterosporium avenae Oud., leaf mold. Oreg. (3), Utah (6).
Lophodermium arundinaceum (Schrad. ex Fr.) Chev., on dead culms. Ariz. (1,2,4,6); Colo., Utah (1); Calif. (6).
Melanospora poae Griff., on dead culms. Wyo. (3).
Mycosphaerella sp., on leaves. Colo. (3), Wash. (4,6), Alaska (6).
M. tassiana (de N.) Johans.—Oreg. (2).
M. tulasnei (Jancz.) Lindau—Oreg. (6).
Ophiobolus graminis Sacc., take-all. Wash. (6).
Ovularia pusilla (Ung.) Sacc. & D.Sacc., leaf spot. Idaho, Wyo. (6).
Phaeoseptoria festucae Sprague, leaf mold. N.Dak. (3). *P. poae* Sprague—Mont. (6).
Phytophthora cactorum (Leb. & Cohn) Schroet., leaf rot. Oreg. (6).
Pleospora karstenii Berl. & Vogl., leaf mold. Oreg. (5).
Puccinia crandallii Pam. & Hume (II,III), rust. Colo. (1). O and I on *Symphoricarpos* spp.
P. graminis Pers. (II,III), stem rust. Calif., Mich., N.Dak., Oreg., Wash., Wyo. (2,3,5,6). Sometimes reported as f. sp. *poae* Eriks. & E.Henn., but the f.

sp. *avenae* Eriks. & E.Henn. has been identified in Wash. on (3).
P. poae-sudeticae (West.) Jørst. (II,III), yellow leaf rust. General on all the named species and others throughout their range. O and I unknown.
P. rubigo-vera (DC.) Wint. (II,III), orange leaf rust. Occasional on all the named species and others from Colo. and Wyo. to Calif. and Wash. The var. *agropyri* (Eriks.) Arth. specified in some reports.
Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, pink root. N.Dak. (4).
Pythium debaryanum Hesse, damping-off, root rot. N.Dak. (4,6), Wash. (4).
P. ultimum Trow—N.Dak. (4,6).
Rhizoctonia solani Kuehn, secondary root rot. Wash. (4, 6); N. Dak., Wyo. (6).
Scolecotrichum graminis Fckl., brown stripe. Widespread, perhaps general, recorded on (3,4, and 6) from N.Dak., and Wyo. to Oreg. and Wash., also in Ariz., Mich.
Selenophoma donacis (Pass.) Sprague & A.G.Johnson, leaf spot, speckle. Colo., Mont., Wyo. (6). Var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, —N.Dak. and Wyo. to Nev., Calif., and Wash., recorded on (1,2,3,4, and 6).
S. obtusa Sprague & A.G.Johnson—Oreg. (4).
Septoria macropoda Pass., leaf blotch. Oreg. Wash. (5). Also var. *grandis* Sprague—N. Dak. and S. Dak. to Oreg. and Wash. (3,4,5,6); Calif. (3,5).
S. oudemansii Sacc., tan leaf spot. N. Dak., S. Dak. (2,3,4,6); Idaho, Mont., Oreg., Wash. (4); Mont. (6).
S. tritici Rob. ex Desm.—slight infection of (4) obtained from inoculation.
Synchytrium sp., purple speck. Oreg., Wash. (2,4).
Typhula idahoensis Remsberg, snow mold. Wash. (4).
Urocystis agropyri (Preuss) Schroet., flag smut. Idaho, Wash. (4); Wyo. (6).
Uromyces dactylidis Otth (II,III), black leaf rust. N.Dak. (4); Oreg. (5); Utah, Wash. (6).
Ustilago spegazzinii Hirsch.—Wash. (2). Also var. *agrestis* (Syd.) G.W.Fisch. & Hirsch.—Wash. (2,3,6), Nev. (5).
U. striiformis (West.) Niessl, stripe smut. Wyo. (4); N.Dak., Oreg., Wash. (6).
BENDS (hairpin)—cause unknown. Wash. (4,5,6).

Polypogon

(1) *P. monspeliensis* (L.) Desf., rabbitfoot-grass.
(2) Other species.

Annual (1) or perennial (2) grasses of southern Europe, established in waste ground chiefly in the Western States and Northeastern States near the coast; of minor forage value; useful to wildlife.

Erysiphe graminis DC., powdery mildew. Calif., Oreg., Wash., Utah (1).
Puccinia coronata Cda. (II,III), crown rust. Calif. (1,2).
P. graminis Pers. (II,III), stem rust. Nebr. (1). The f. sp. *avenae* Eriks. & E.Henn. identified.

Puccinellia, alkaligrass

(1) *P. distans* (L.) Parl.
(2) *P. nuttalliana* (Schult.) Hitchc.
(3) *P. nutkaensis* (Presl) Fern. & Weath.
(4) Other species.

Perennial grasses of moist, usually alkaline, habitats, chiefly in the Western States and locally in the Great Lakes States and in the Northeast near the coast; of minor forage value, especially the form of (2) known as Zawadke alaki-grass, cultivated in Montana; useful to wildlife.

Cladosporium graminum (Pers. ex Lk.), leaf mold. Oreg. (1).
Claviceps purpurea (Fr.) Tul., ergot, Wash. (1).
Erysiphe graminis DC., powdery mildew. Wash. (1).
Lophodermium arundinaceum (Schrad. ex Fr.) Chev., on dead culms. ?Mass. (4).
Puccinia glumarum (Schm.) Eriks. & E.Henn. (II,III), stripe rust. Wash. (2.3,4).
P. graminis Pers. (II,III), stem rust. Mich. (1), Calif. (2), Wash. (1,2,3).
P. poae-sudeticae (West.) Jørst. (II,III), yellow leaf rust. Wash. (2).
P. rubigo-vera (DC.) Wint. (II,III), orange leaf rust. Calif., Colo., N.Dak., Oreg., Utah, Wash., Wyo. (2); also Oreg., Wash. (1,3).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, leaf spot. N.Dak. (2).
Ustilago spegazzinii Hirsch., stem smut. Wash. (1), Calif. (2).
U. striiformis (West.) Niessl, stripe smut. Oreg. (2).

Redfieldia

R. flexuosa (Thurb.) Vasey, blowoutgrass.

Perennial with strong creeping rhizomes, occurring in sandhills from South Dakota to Oklahoma and Arizona; useful in soil-erosion control.

Physalospora sp., on awns. N.Dak.
Puccinia redfieldiae Tracy (II,III), leaf rust. Colo., Kans., N.Dak., Nebr. O and I unknown.
Tilletia redfieldiae Clint., seed smut, bunt. Nebr.

Saccharum

S. officinarum L., sugarcane.

This name is applied both to the species from which many cultivated sugarcanes are derived, and to the cultigen in which this species and others such as *S. sinensis* Roxb., *S. barberi* Jeswiet, and *S. spontaneum* L. have been combined by breeding and selection. All are robust perennial grasses, native to southern and southeastern Asia and neighboring islands. The parent species show marked differences in their reaction to certain diseases but in the following list no attempt is made to discriminate between the component species of cultivated sugarcane. It is cultivated commercially in the Gulf States from Florida to Texas, chiefly in Louisiana, and also throughout the West Indies and in Hawaii, furnishes sugar, sirup, feedstuffs, and various byproducts.

Allantospora radicicola Wakk., on roots and other parts, probably saprophytic. T.H.
Alternaria sp. (*?A. tenuis* Nees ex Cda.), leaf and cane molds, also on roots, probably as a saprophyte. Cosmopolitan.
Anguina spermophaga Steiner, nematode disease of florets and seed. On *S. spontaneum*—in greenhouse, Va.
Apiospora camtospora Penz. & Sacc., on fading leaves. P.R.
Arthrobotrys superba Cda., leaf mold. P.R.
Aspergillus spp., mold on canes, sugar, and byproducts;

saprophytic, but sometimes important in sugar deterioration. All species of more or less cosmopolitan distribution, those commonly mentioned as economically important include *A. flavus* Lk., *A. fumigatus* Fres., *A. herbariorum* (Wigg.) E.Fisch., *A. nidulans* (Eidam) Wint., *A. niger* v. Tiegh., *A. penicillioides* Speg., *A. repens* (Cda.) d By. & Wor., *A. sydowii* (Bainier & Sartory) Thom & Church, *A. terreus* Thom. A form of *A. flavus*, designated *A. parasiticus* Speare, is reported on mealybugs infesting cane in P.R. and T.H.

Asterostroma cervicolor (Berk. & Curt.) Mass., on basal leaf sheaths. P.R.

Bacillus megatherium d By., and *B. mesentericus* Trevisan, on cane causing sugar deterioration. La.

Bacterium rubrilineans, B. rubrisubalbicans, and *B. vascularum:* See *Xanthomonas.*

Ceratostomella adiposum Sartoris and *C. paradoxa* Dade: See *Endoconidiophora.*

Cercospora koepkei Krueger (*C. longipes* Butl.), brown spot. Ala., Fla., La., P.R.

C. vaginae Krueger, red leaf-sheath spot. Fla., La., Tex., P.R., T.H.

Chytridium sp., in roots of plants affected with Lahaina disease. T.H. An organism of Chytrid affinities has been reported also in the vascular tissue of plants affected with chlorotic streak in Hawaii.

Cladosporium herbarum Pers. ex Lk., gray-green mold of cut leaves and cane. Cosmopolitan.

Clathrus columnatus Bosc, stinkhorn; saprophytic on plant debris but has been considered a factor in root decay. Gulf States, P.R., T.H.

Colletotrichum falcatum Went, red rot. General. Conidial stage of *Physalospora tucumanensis.* Reports of *C. graminicola* (Ces.) G.W.Wils. and *C. lineola* Cda. on sugarcane belong here. The group of *Colletotrichum* races commonly found on sugarcane are specialized pathologically for this host.

Coniosporium arundinis (Cda.) Sacc.: See *Papularia.*

Corticium sasakii (Shirai) T. Matsu. (*?Rhizoctonia grisea* (Stevenson) Matz), on leaf blades, sheaths, and stalks; "banded sclerotial disease." La., P.R. Probably a *Pellicularia.*

Curvularia sp., on roots, ? secondary root rot. La. *C. lunata* (Wakk.) Boed., secondary leaf spot, leaf mold. T.H.

Cytospora sacchari Butl., sheath rot. Ga., La., P.R.

Diplodia cacaoicola P.Henn.: See *Physalospora rhodina.*

Endoconidiophora adiposa (Sartoris) Davidson, black rot of seed cane. La., T.H.

E. paradoxa (Dade) Davidson, "pineapple rot" of seed cane. Gulf States, P.R., T.H.

Eriosphaeria sacchari (B. de Haan) Went, red leaf spot. T.H.

Fusarium spp., associated with root rot, cane and leaf rots, seed cane rot, and sugar deterioration. Gulf States, P.R., T.H.

F. moniliforme Sheldon: See next entry.

Gibberella fujikuroi (Saw.) Wr., top rot, pokkah boeng. Gulf States, P.R., T.H. Typically found in nature in the conidial state, *F. moniliforme.* Also var. *subglutinans* (Wr. & Reinking) Edwards, pokkah boeng. La., T.H.

Gloeocercospora sorghi D.Bain & Edg., zonate leaf spot. La.

Gnomonia iliau Lyon, leaf-sheath and cane spot, "iliau" disease. La., Miss., T.H.

Graphium sacchari Speg., leaf mold. P.R.

Helminthosporium sacchari (B. de Haan) Butl. (*H. ocellum* Faris), eyespot, Florida ring spot. Gulf States, P.R., T.H.

H. stenospilum Drechs., brown stripe. Fla., Ga., La., P.R., T.H. The ascigerous stage has been produced in cultures in Hawaii and designated *Ophiobolus stenospilus* Carpenter, also in Japan as *Cochliobolus stenospilus* T. Matsu. & Yamamoto, neither with formal description.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Himantia stellifera J.R.Johnston (*?Odontia saccharicola* Burt), on leaf sheaths and roots, web-blight. P.R., T.H.

Hoplolaimus sp., in roots. T.H. *H. coronatus* Cobb has been found parasitizing sugarcane roots in greenhouse cultures.

Hormiactella sacchari J. R. Johnston, on leaves, ? withertip. Fla., P.R.

Hypocrea gelatinosa Tode ex Fr. (=*H. rufa* Pers. ex Fr.?), on canes and leaf sheaths. P.R. See also *Trichoderma lignorum.*

Ithyphallus rubicundis (Bosc) E.Fisch., stinkhorn. On cane trash as saprophyte but has been considered a factor in root decay. T.H.

Leptosphaeria sacchari B. de Haan, on leaves, associated with ring spot. Cosmopolitan. Often cited as the cause of ring spot, this relation doubtful but the fungus may play a secondary role.

Ligniera vascularum (Matz) Cook, in vascular tissue of stem bases causing or associated with dry top rot. P.R. Described as *Plasmodiophora vascularum* Matz, it is excluded from this genus by Karling; it has also been placed in *Sorosphaera.* W. R. I. Cook held that 2 organisms of protozoan affinity were involved: *Amoebosporus saccharinum* W. R. I. Cook and *A. vascularum* (Matz) W. R. I. Cook. The spelling should be *vasculorum.*

Lophodermium sacchari Lyon, on leaves. T.H., ? P.R.

Macrophoma sacchari (Cke.) Berl. & Vogl., on culms. Ga.

Marasmius sacchari Wakk., on roots and stem bases, associated with root disease complex. P.R., T.H., V.I.

M. stenophyllus Mont., associated with root decay. Gulf States. Several other species of *Marasmius* occur on dead cane parts.

Melanconium sacchari Mass. ap. Speg., rind disease, cane rot, a factor in sugar deterioration. Cosmopolitan.

Meloidogyne sp., root knot nematodes. Gulf States, P.R., T.H.

Microdiplodia melaspora (Berk.) Griff. & Maubl., on culms. P.R. In part=*Melanconium sacchari.*

Mycosphaerella sacchari (Speg.) Seaver & Chardon, on leaves, associated with withertip. P.R.

M. striatiformans Cobb, on leaves, associated with leaf-splitting. T.H.

Myriogenospora aciculisporae Vizioli, tangle-top. La.

Nectria spp., on dead or sometimes living but moribund canes. Fla., P.R., T.H., *N. flavociliata* Seaver and *N. laurentiana* El. Marchal (*Creonectria laurentiana* (El. Marchal) Seaver & Chardon) are reported in P.R.

Nematodes. A number of genera of nematodes have been reported on diseased roots of sugarcane or in adjacent soil, particularly in Hawaii; they are too numerous to list because of the lack of information on their relation to root disease. The genera known to include species parasitic on sugarcane are: *Heterodera, Hoplolaimus, Pratylenchus,* and *Rotylenchus.*

Neurospora sitophila Shear & Dodge, on plant debris of all kinds especially after burning; thought to injure seed cane. La., P.R., T.H.

Nigrospora oryzae (Berk. & Br.) Petch, black mold on canes and leaves, secondary leaf spot. Cosmopolitan.

Odontia saccharicola Burt, leaf-sheath adhesion and rot. P.R., T.H.

Olpidium sacchari Cook, in roots, ? secondary rot. P.R.

Papularia sphaerosperma (Pers. ex Lk.) Hoehn., on

dead culms, black smudge. Cosmopolitan. *P. arundinis* (Cda.) Fr. is a closely related form or is synonymous.

P. vinosa (Berk. & Curt.) Mason, on moribund parts of leaves and culms, secondary or perhaps sometimes primary leaf spot. Gulf States, P.R., T.H. *P. sacchari* Speg. is considered synonymous. A different *Phyllosticta* (*P. saccharicola* P.Henn.) has been shown to be the conidial stage of *Leptosphaeria sacchari*.

Physalospora rhodina (Berk. & Curt.) Cke. (*Diplodia cacaoicola* P.Henn., *D. theobromae* (Pat.) Nowell), dry rot, internal rot of canes, seed cane rot. Gulf States and tropical America.

P. tucumanensis Speg. (*Colletotrichum falcatum* Went), red rot. La., P.R. General in conidial stage.

Phytophthora erythroseptica Pethyb., seedpiece rot. La.

Plasmodiophora vascularum Matz: See *Ligniera*.

Plectospira gemmifera Drechs., rootlet rot. La.

Polyporus spp., on dead culms, probably saprophytic. P.R. The following species reported: *P. occidentalis* Klotzsch, *P. sanguineus* L. ex Fr., *P. tulipiferus* (Schw.) Overh.

Poria ambigua Bres., on dead culms. Fla.

Pratylenchus pratensis (De Man) Filip., in roots. Hawaii; also in U.S. in greenhouse cultures.

Psilocybe atomatoides Pk., discoloration and deterioration of bagasse (crushed and shredded cane). La.

Pythium spp., root rot. Fla., La., P.R., T.H. Although numerous species have been found associated with diseased roots, *P. arrhenomanes* Drechs., in southern U.S. and the West Indies, and *P. graminicola* Subr. in Hawaii, appear to be the most prevalent and active agents of root necrosis. Other species determined to be pathogenic either to roots or to seed cane are: *P. aphanidermatum* (Edson) Fitzp.—Fla., La., T.H.; *P. artotrogus* (Mont.) d By.—La., T.H.; *P. debaryanum* Hesse—Ga., La., T.H.; *P. dissotocum* Drechs.—La.; *P. helicoides* Drechs.—Fla.; *P. irregulare* Buis.—La.; *P. mamillatum* Meurs—La.; *P. monospermum* Pringsh.—La.; *P. periilum* Drechs.—La.; *P. rostratum* Butl.—T.H.; *P. splendens* Braun—T.H.; *P. ultimum* Trow—La.; *P. vexans* d By.—La.

Rhizoctonia ferruginea Matz, secondary (?) root rot. P.R. Perhaps a form of *Pellicularia filamentosa*.

R. grisea (Stevenson) Matz: See *Corticium sasakii*.

R. pallida Matz, root rot (?secondary). P.R.

R. solani Kuehn (=*Pellicularia filamentosa* (Pat.) Rogers), secondary root rot, basal sheath rot. La., P.R.

Rosellinia paraguayensis Speg., and *R. pulveracea* (Ehrh.) Fckl., on dead canes. P.R.

Rotylenchus similis (Cobb) Filip., in roots. La., T.H.

Saccharomyces zopfii Artari, sugar deterioration. La.

Schizophyllum commune Fr., wound rot of canes. Fla., La., P.R., T.H.

Scirrhia lophodermioides Ell. & Ev., on dead cane. P.R.

Sclerotium rolfsii Sacc. (=*Pellicularia rolfsii* (Curzi) E.West), basal stalk and leaf-sheath rot. Gulf States, P.R., T.H.

Thielaviopsis paradoxa (De Seyn.) Hoehn.: See *Endoconidiophora paradoxa*.

Trichoderma lignorum Tode ex Harz (=*T. viride* Pers. ex Fr.?), green mold of canes, seed-cane rot; sugar deterioration. Cosmopolitan. Conidial stage of *Hypocrea rufa* Pers. ex Fr.

Tuberculariа saccharicola Speg., on dead canes. P.R.

Vermicularia graminicola West., on moribund leaves. P.R. *Colletotrichum dematium* (Pers. ex Fr.) Grove.

Xanthomonas albilineans (Ashby) Dows., leaf scald. T.H.

X. rubrilineans (Lee et al.) Starr & Burkh., red stripe. Fla., Ga., La., P.R., T.H.

X. rubrisubalbicans (Christopher & Edg.) Savul., mottled stripe. La., P.R. Originally on D-74 var. and its hybrids, rare as these have become obsolete.

X. vasculorum (Cobb) Dows., gummosis. P.R.

Xylaria apiculata Cke., on dead canes. P.R.

Chlorotic streak—virus (*Fractilinea quarta* Holmes). La., P.R., T.H.

Mosaic—virus (*Marmor sacchari* Holmes, Saccharum virus 1 K.M.Sm.). General.

Sereh—virus (*Nanus sacchari* Holmes, Saccharum virus 3 K.M.Sm.). T.H.

Banded (sectional) Chlorosis—chilling of undeveloped leaves at base by contact with cold water (40°–50°F). Occasional in southern U.S., P.R., and T.H.

Chlorosis—mineral (iron or manganese) deficiency due to excess of lime. P.R., T.H. Coral chlorosis in Hawaii is specifically attributed to iron deficiency, Pahala blight to manganese deficiency.

Dry top rot. See *Ligniera vascularum*.

Dwarf—cause unknown, virus suspected. T.H.

Galls (stem galls, node galls of Uba variety)—cause unknown, nematodes or virus suspected. La., P.R., T.H.

Iliau. See *Gnomonia iliau*.

Lahaina disease. See Root disease.

Multiple bud (gall multiple bud)—cause unknown, virus suscepted. La. Possibly the same as Dwarf in Hawaii.

Pahala blight. See Chlorosis.

Pokka boeng (bong). See *Gibberella fujikuroi*.

Root disease. In all cultivation areas. Complex pathological condition resulting from or associated with various pathological factors including environmental, nutritional, and biological. The principal nutritional factors cited are aluminum toxicity (? Lahaina disease in Hawaii), soil acidity, and excessive salt concentration. The principal biological factors cited are root injury by snails, centipedes, nematodes, and fungi, especially *Pythium;* other fungi reported in this connection are *Clathrus, Ithyphallus, Marasmius, Rhizoctonia,* and *Thielaviopsis*.

Top rot. Usually identified with pokkah boeng *(Gibberella fujikuroi)* or red stripe *(Xanthomonas rubrilineans)*.

Twisted top—attributed to mechanical injury of leaves. Occasional in all cultivated areas.

Withertop—environmental (excessive water loss), nutritional, secondary effect of root disease, and secondary leaf-infecting fungi.

Schedonnardus

S. paniculatus (Nutt.) Trel., tumblegrass.

Perennial grass of prairies and plains from Illinois to Montana and New Mexico; of minor forage value when young.

Fusarium scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak.

Helminthosporium halodes Drechs., leaf mold. Minn., N.Dak.

Puccinia schedonnardi Kell. & Swing. (II,III), rust. Colo., Kans. N.Dak., Nebr., S.Dak. O and I on Malvaceae.

Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, pink root. Minn., N.Dak.

Schizachne

S. purpurascens (Torr.) Swallen, false-melic.

Perennial grass of woodlands ranging from Maine to Kentucky and the Dakotas, and in the mountains from Montana to New Mexico; useful to wildlife.

Ascochyta graminicola Sacc., leaf spot. Wis.
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Minn., N.Dak., Wis.
Hendersonia sp., leaf rot. Minn.
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. N.Y., Wis.
Phyllosticta sp., leaf spot. Minn.
Puccinia coronata Cda. (II,III), crown rust. Wis.
Septoria melicae Pass., leaf spot. ?Mass.

Scleropogon

S. brevifolius Phil., burrograss.

Perennial grass of arid plains of the Southwestern States, of some forage value when young, and useful in controlling erosion.

Puccinia aristidae Tracy (II,III), rust. N.Mex. O and I on plants of numerous dicotyledonous families.

Secale

(1) *S. cereale* L., rye.
(2) *S. montanum* Guss.

Cereal and soiling crop (1), grown throughout the United States except the Far South and Southwest, especially in the Middle Atlantic and Great Lakes States; sometimes escaped and naturalized; (2) is a perennial grass of southwestern Asia, the supposed ancestor of cultivated rye; grown in cereal-breeding plots. Entries without numbers apply only to (1).

Alternaria sp. and *A. tenuis* Nees ex Cda., on glumes associated with or simulating black-chaff disease, also secondary leaf spot. Del., Md., N.Dak., N.J.
Anguina tritici (Steinb.) Filip., leaf and spike distortion, "cockles." Ill., N.C., S.C., Va.
Ascochyta graminicola Sacc., leaf spot. Ill.
Cercosporella herpotrichoides Fron, foot rot. Idaho, Oreg., Wash.
Cladosporium herbarum Pers. ex Lk., mold of glumes and leaves, associated with or simulating black-chaff disease. Md., Ohio, Tenn.; probably cosmopolitan. Conidial stage of *Mycosphaerella tulasnei* (Jancz.) Lindau.
Claviceps purpurea (Fr.) Tul., ergot. General (1,2).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Eastern States (except New England), Southern and Central States to Tex. and N.Dak.
Curvularia inaequalis (Shear) Boed., seed mold. Minn., N.Dak.
Dilophospora alopecuri Fr., twist. Oregon.
Dinemasporium graminum Lév., leaf mold. Cosmopolitan.
Ditylenchus dipsaci (Kuehn) Filip., leaf and stem nematode. Kans., Va.
Erysiphe graminis DC., powdery mildew. General. Usually designated f. sp. *secalis* Em. Marchal, which is restricted to *Secale* spp.
Fusarium avenaceum (Fr.) Sacc., head mold, following ergot or scab. Ind., Ohio.
F. culmorum (W.G.Sm.) Sacc., seedling blight, foot rot, ? head blight or scab. Conn. to Va., Ark., and N.Dak.; also Pacific coast. A var. *cereale* (Cke.) Wr., prevalent on cereals, has been distinguished.
F. equiseti (Cda.) Sacc., secondary root rot. N.Dak.
F. graminearum Schwabe: SEE *Gibberella zeae*.
F. heterosporum Nees, head mold, often following ergot. Ill.
F. nivale (Fr.) Ces., snow mold. N.Dak., Wash. (1); Wash. (on *S. cereale* × *S. montanum*).
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak., Oreg.
Gibberella zeae (Schw.) Petch, seedling blight, foot rot, scab. N.Y. to N.C., Tex., and Minn.; Calif.
Helminthosporium sativum Pam., King, & Bakke, root rot, leaf blotch. N.Y. to N.C., Tex., and N.Dak.; ?Calif.
?H. tritici-repentis Died. (=*Pyrenophora tritici-repentis* (Died.) Drechs.), on leaves. W.Va.
H. tuberosum Atk., on dead culms. Ala., Del.
Leptosphaeria herpotrichoides de N., on dead culms. N.Dak., Wash.
Lophodermium arundinaceum (Schrad. ex Fr.) Chev. var. *culmigenum* (Fr.) Fckl., on dead culms. N.Y.
Mucrophoma secalina Tehon, on leaves and culms, ? leaf blight. Ill.
Marasmius tritici P.A.Young (=*M. scorodonius* Fr.?), on roots and base of culms. Ill.
Naucoria cerealis Boewe, on roots and base of culms. Ill.
Nectria secalina Ell. & Ev., on dead culms. Ala.
Ophiobolus graminis Sacc., take-all. Ill., N.Y., Okla.
Pratylenchus pratensis (De Man) Filip., in roots. Va.
Pseudomonas coronafaciens (Elliott) F.L.Stevens, halo blight. Wash.
Puccinia glumarum (Schm.) Eriks. & Henn. (II,III), stripe rust. Idaho, Oreg. (1); Wash. (1,2).
P. graminis Pers. (II,III), stem rust. General. The f. sp. *secalis* Eriks. & E.Henn. commonly infects rye in nature; natural infection with the f. sp. *tritici* Eriks. & E.Henn. also has been reported.
P. rubigo-vera (DC.) Wint. (*P. dispersa* Eriks. & E.Henn.) (II,III), leaf rust. General (1,2). The f. sp. *secalis* (Eriks.) Carl. with I on *Lycopsis (Anchusa)* spp., is the only one reported on rye.
Pyrenophora relicina (Fr.) Fckl., on leaves. Ga. *P. trichostoma* (Fr.) Fckl., on dead culms. Pa.
Pythium spp., root browning, root necrosis, damping-off. Specifically identified are: *P. arrhenomanes* Drechs. in Mo. and N.Dak., ? Va.; *P. debaryanum* Hesse in N.Dak. (1,2).
Rhizoctonia solani Kuehn, root and stem rot. Miss.
Rhynchosporium secalis (Oud.) J.J.Davis, scald. Calif., Ill., N.C., Oreg., Utah, Wis. (1); Wash. (1,2).
Scolecotrichum graminis Fckl., brown stripe. Okla., Oreg., S.C. (1); Wash. (1,2).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, leaf spot, speckle. Minn., N.Dak.
Septoria nodorum Berk., glume blotch. Ark., Ind., Md., Ohio, Wis.
S. secalis Prill. & Del., on leaves and leaf sheaths, leaf blotch. Va. to Ala., Tex., and N.Dak.
Stemphylium botryosum Wallr., seed mold. Cosmopolitan.
Tilletia caries (DC.) Tul. (*T. secalis* (Cda.) Kuehn, rough-spored bunt. Calif., N.Y., Oreg., Wash.
T. foetida (Wallr.) Liro (*T. levis* Kuehn), smooth-spored bunt. Calif., Kans., Mich., Wash.
Typhula itoana Imai, snow mold. Wash.
Urocystis occulta (Wallr.) Rabh., flag smut. Mass. to Ala., Tex., Colo., and N.Dak.; general east of the Rocky Mountains.
Ustilago hordei (Pers.) Lagh., covered smut. Wash.
Ustilago spegazzinii Hirsch., stem smut. Wash. (on *Secale* sp.)
U. tritici (Pers.) Rostr., loose smut. Occasional in the Eastern and Central States (Mass. to Va., Okla., and N.Dak.); some reports as *Ustilago* sp. may involve *U. hordei*.
Wojnowicia graminis (McAlp.) Sacc. & D.Sacc., secondary root rot. Mont., Oreg., Wash.
Xanthomonas translucens (L.R.Jones, A.G.Johnson, & Reddy) Dows. f. sp. *secalis* (Reddy, Godkin, & A.G.Johnson) Hagb., bacterial blight. Ind. to Iowa, N.Dak., and Wis.; Ariz., Calif. Unidentified bacterial disease reported also in Colo., Idaho, Kans., Wash., ? Md.
X. translucens f. sp. *undulosa* (E.F.Sm., L.R.Jones, & Reddy) Hagb., black-chaff. Wis.

MOSAIC—virus (*Marmor graminis* McK.) Kans.
MOSAIC-ROSETTE—virus (*Marmor tritici* Holmes, Triticum virus 1 K.M.Sm.).—Ill., Va.
BENDS (hairpin)—cause unknown. Wash. (2).

Setaria (*Chaetochloa*)

I. Cultivated Annual

Setaria italica (L.) Beauv., foxtail millet (also in different agronomic varieties, German, Hungarian, Italian, and Siberian millet).

Eurasian annual, cultivated since prehistoric times as cereal; in the United States grown chiefly for green feed and hay, especially in the Central States and southward; sometimes naturalized in waste ground.

Cladosporium graminum Pers. ex Lk. (=*C. herbarum* Pers. ex Lk.?), leaf and head mold. Cosmopolitan.
Epicoccum purpurascens Ehr., leaf mold. Oreg.
Fusarium spp., secondary root rot, the following specifically identified: *F. equiseti* (Cda.) Sacc., *F. moniliforme* Sheldon, *F. oxysporum* Schlecht., *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., *F. solani* (Mart.) Appel & Wr. All reported in N.Dak.
Helminthosporium halodes Drechs., secondary root rot. Minn., N. Dak., S. Dak.
H. sativum Pam., King, & Bakke, root rot. Minn., N. Dak.
H. setariae Saw., leaf spot. Md., N.J. Also secondary root rot—N. Dak. The ascigerous stage *Ophiobolus setariae* S. Ito & Kuribay. has not been reported in the U.S.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ? S.C.
Piricularia grisea (Cke.) Sacc., gray leaf spot. Mass. to Ala., Tex., and Wis.
Pseudomonas alboprecipitans Rosen, bacterial spot. Ark., ?Mont.
P. syringae v. Hall. (*P. holci* Kendr.), bacterial spot. Minn., N. Dak.
Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, pink root. Iowa, Minn., N. Dak.
Pythium arrhenomanes Drechs., root browning. Minn., N. Dak., S. Dak.
P. debaryanum Hesse, damping-off. Minn., N. Dak., S. Dak.
Sclerospora graminicola (Sacc.) Schroet, downy mildew. Mich. to Kans. and Mont.; T.H.
Tylenchus spiralis Cassidy, root nematode. T.H.
Ustilago crameri Koern., head smut. General.
MOSAIC — unidentified virus (? *Marmor sacchari* Holmes). T.H.

II. Introduced Annuals—Weeds

(1) *Setaria lutescens* (Weigel) F. T. Hubb. (erroneously as *S. glauca* (L.) Beauv., a synonym of *Pennisetum glaucum* (L.) R. Br.), yellow bristlegrass, pigeongrass.
(2) *S. verticillata* (L.) Beauv., bur bristlegrass.
(3) *S. virdis* (L.) Beauv., green bristlegrass.
(4) Other species.

Introduced grasses: (1,2,3) European grasses widely established in the United States, (1) and (2) east of the Great Plains and in the Pacific States, (3) throughout the United States except the South, all three are troublesome weeds in cultivated fields but furnish food for wildlife; (4) of various origin.

Aphanomyces sp., root necrosis. Mont. (3).
Cercospora setariae Atk., leaf spot. Ala., Iowa, Ky., N. Dak., N.Y., Tex. (1). *C. setariicola* Tehon & Daniels —Ill., Mich., N. Dak., Wis. (1).
Claviceps purpurea (Fr.) Tul., ergot. N.Mex. (3).
Curvularia geniculata (Tracy & Earle) Boed., secondary root rot. Minn., N. Dak. (3). *C. falcata* (Tehon) Boed., leaf mold. P.R. (4).
Fusarium spp., secondary root rot, the following specifically identified: *F. moniliforme* Sheldon, *F. oxysporum* Schlecht., *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., *F. solani* (Mart.) Appel & Wr. N.Dak. (3). SEE ALSO *Gibberella*.
Gibberella zeae (Schw.) Petch, root and culm rot, head mold. Wis. (1).
Gloeosporium bolleyi Sprague, root rot (? secondary). N.Dak. (3).
Helminthosporium sp., leaf spot. Minn., Tex. (1); S.Dak. (3).
H. halodes Drechs., secondary root rot. Minn., N.Dak., S.Dak. (3).
H. monoceras Drechs., leaf spot. N.Dak. (3).
H. sativum Pam., King, & Bakke, root rot. Ky., Minn., N.Dak. (1,3).
H. setariae Saw., leaf spot, also on roots. Md., N.Dak. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Melasmia setariae Atk., leaf spot. Ala., S.C. (1).
Meloidogyne sp., root knot nematodes. T.H. (2), Ky. (3).
Ophiobolus acuminatus (Sow. ex Fr.) Duby, on dead culms. Ga. (1).
Phyllosticta sorghina Sacc., leaf spot. N.Dak. (3).
Piricularia grisea (Cke.) Sacc., gray leaf spot. Vt. to Va., Tex., and Wis. (1,3). Also reported as *P. setariae* Nisikado.
Pratylenchus pratensis (De Man) Filip, root nematode. Ky. (3).
Pseudomonas alboprecipitans Rosen, bacterial spot. N.Y., Pa., Va. (1).
P. syringae v. Hall—Iowa (1); Mont., N.Dak., Oreg. (3).
Puccinia substriata Ell. &. Barth. (II,III), rust. Tex. (1). O and I on native *Solanum* spp.
Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, pink root. Minn., N.Dak., S.Dak. (1,3).
Pythium arrhenomanes Drechs. and *P. debaryanum* Hesse, root necrosis. Minn., N.Dak., S.Dak. (3).
Rhizoctonia solani Kuehn, secondary root rot. Nebr., N.Dak., S.Dak. (3).
Rhopographus clavisporus (Cke. & Pk.) Sacc., on dead culms. Ga. (1).
Sclerospora graminicola (Sacc.) Schroet., downy mildew. Iowa, N.Y., Wis. (1); N.Y. to N.Mex. and Mont. (3); Fla. (4).
Septoria ?graminum Desm., leaf spot. Wis. (3).
Sphacelotheca magnusiana (Fisch. v. Waldh.) Cif. (*S. pamparum* (Speg.) Clint.), seed smut. ?Tenn., Wis. (1).
Sporotrichum peribebuyense Speg., leaf blister. Ill., Ky., Okla. (1).
Stemphylium botryosum Wallr., seed mold. N.Dak., S. Dak. (3).
Ustilaginoidea setariae Bref., false smut. La. (4).
Ustilago neglecta Niessl, head smut. General (1), ?Iowa (3).
BENDS—cause unknown. Mich. (1).
MOSAIC—virus (*Marmor sacchari* Holmes, Saccharum virus 1 K.M.Sm.). T.H. (2), Fla. (4).

III. Perennial Species

(1) *Setaria geniculata* (Lam.) Beauv., knot-root bristlegrass.
(2) *S. macrostachya* H.B.K., plains bristlegrass.
(2) *S. setosa* (Swartz) Beauv., West Indies bristlegrass.
(4) Other species.

Native grasses of waste ground: (1) near the coast from Massachusetts to Texas and California, or occasionally inland; (2) on dry plains in the Southwest; (3) throughout tropical America; of minor forage value; useful to wildlife.

Angiopsora cameliae (Mayor) Mains (II,III), rust. Tex. (2,4); P.R. (3).
Cercospora setariicola Tehon & Daniels, leaf spot. Okla. (1).
Claviceps purpurea (Fr.) Tul., ergot. N.Mex. (2). *C. ranunculoides* Moell.—Ariz., Tex. (2).
Heiminthosporium sp., leaf spot. Tex. (1).
Ophiobolus graminis Sacc., take-all. Ark. (1).
Phyllachora cornispora Atk., tar spot. C.Z. (3).
Puccinia chaetochloae Arth. (II,III), rust. Fla. (on *S. macrosperma* (Scribn. & Merr.) Schum.). O and I unknown.
P. setariae Diet. & Holw. (II,III)—La. (1).
Uromyces leptodermus Syd. (II,III), rust. Fla., C.Z., P.R. (1). O and I unknown.
U. puttemansii Rangel (II,III)—C.Z. (on *S. paniculifera* (Steud.) Fourn.). O and I unknown.

Sitanion

(1) *S. hystrix* (Nutt.) J.G.Sm., squirreltail-grass.
(2) *S. jubatum* J.G.Sm., big squirreltailgrass.
(3) Other species.

Perennial grasses of dry plains: (1) throughout the Western States, (2) and (3) in the Far West; of minor forage value when young but at maturity becoming injurious to grazing animals because of the long rough awns; useful to wildlife.

Ascochyta graminicola Sacc. var. *holci* Sacc., leaf spot. Oreg. (1); Wash. (2).
Cercosporella herpotrichoides Fron, foot rot. Idaho (1).
Claviceps purpurea (Fr.) Tul., ergot. Oreg. (1).
Corynebacterium agropyri (O'Gara) Burkh., bacterial spot. Calif. (1), Wash. (2).
Dilophospora alopecuri Fr., twist. Oreg. (2), Wash. (1,2).
Erysiphe graminis DC., powdery mildew. Ariz., Calif., Nev. (1); Utah (2).
Fusarium ? nivale (Fr.) Ces., snow mold. Calif. (1), Wash. (2).
Lophodermium arundinaceum (Schrad. ex Fr.) Chev., on dead culms and leaves. Calif. (1).
Puccinia glumarum (Schm.) Eriks. & E.Henn. (II,III), stripe rust. Calif., Oreg. (*); Colo., Wyo. (1); Wash. (1,2).
P. graminis Pers. (II,III), stem rust. Colo., N.Mex., Utah, Wash., Wyo. (1); Idaho (2); Mich. (1,2).
P. montanensis Ell. (II,III), brown stripe rust. Colo., Mont., Utah (1). O and I on *Berberis fendleri* A. Gray.
P. pattersoniana Arth. (II,III), leaf rust. Calif. (2,3); Idaho, Oreg., Utah (1); Wash. (2). O and I on *Brodiaea douglasii* S.Wats.
P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Ariz., Calif., Colo., Idaho, N.Mex., Wyo. (1); Mich., Oreg., Utah, Wash. (1,2). The var. *agropyri* (Ell. & Ev.) Arth. with O and I on Ranunculaceae, and var. *apocrypta* (Ell. & Tracy) Arth. with O and I on Boraginaceae and Hydrophyllaceae, have been identified.
Rhizoctonia solani Kuehn, secondary root rot. Wyo. (1).
Scolecotrichum graminis Fckl., brown stripe. Calif., Utah (2); Ariz., Mont., Nev., Wyo. (1); Oreg. (1,3), Wash. (3).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson, var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, stem speckle. Mont., N.Mex., Oreg., Wash. (1).
S. obtusa Sprague & A.G.Johnson—Calif. (1,3); Idaho, Utah (1).
Septoria passerinii Sacc., leaf blotch. Oreg. (1).
Urocystis agropyri (Preuss) Schroet., flag smut. Wash. (2).
?Ustilago bullata Berk. (*U. lorentziana* Thuem.), head smut. Utah (1).
U. sitanii G.W.Fisch., loose smut. Oreg., Wash. (*).
U. spegazzinii Hirsch., stem smut. Calif., N.Mex., Utah (1); Wash. (2). Also var. *agrestis* (Syd.) G.W. Fisch. & Hirsch.—Calif. (1,3).
U. striiformis (West.) Niessl, stripe smut. Calif., Idaho (1), Oreg. (2); Utah (3).

Sorghastrum

(1) *S. nutans* (L.), Indian grass.
(2) *S. elliottii* (Mohr) Nash, slender Indian grass.

Native perennial grasses, (1) occurring in open woodlands and prairies from the Atlantic coast to the Great Plains and at low altitudes to Arizona and Wyoming, an important constituent of prairie hay; (2) in the Southeastern and Gulf States.

Cerebella andropogonis Ces., head mold following ergot. Ala., Ark., Kans., Miss., Tex. (1). *C. sorghi* Tracy & Earle (probably a synonym)—Miss. (1).
Cladosporium graminum Pers. ex. Lk., leaf mold. Ala. (1).
Claviceps purpurea (Fr.) Tul., ergot. Kans., Okla., Tex. (1). SEE ALSO *Cerebella.*
Colletotrichum graminicola (Ces.) G.W. Wils., anthracnose. Kans., Okla., Wis. (1).
Ellisiella caudata (Pk.) Sacc., on fading leaves. N.J., Wis. (1).
Helminthosporium sp., leaf spot. Kans. (1).
Phyllachora luteo-maculata (Schw.) Orton, tar spot. Iowa, Tex. (1).
Pseudomonas syringae van Hall, bacterial spot. N.Dak. (1).
Puccinia virgata Ell. & Ev. (II,III), rust. Pa. to Fla., Tex., Nebr., and Wis. (1). O and I unknown.
Pythium arrhenomanes Drechs., root browning. N.Dak. (1).
Septogloeum bartholomaei (Pk.) Wr., on leaves. Kans. (1).
Septoria andropogonis J.J.Davis var. *sorghastri* H.C. Greene & Sprague, leaf spot. Nebr., Wis. (1).
Sphacelotheca chrysopogonis Clint., seed smut. Md. (1).
S. sorghastri Zundel, head smut. Ga., Va. (2).
Stagonospora simplicior Sacc. & Briard f. *andropogonis* Sacc., leaf mold. N.Dak., Wis. (1).
Tolyposporella chrysopogonis Atk., leaf smut. Ala., Kans., Nebr., Tex. (1).

Sorghum

S. halepense (L.) Pers., Johnson grass.
Perennial of Mediterranean origin, widely

established in warm regions throughout the world; in the United States cultivated for forage mostly in the South, naturalized north to Massachusetts and west to Iowa, Texas, and California, often becoming a weed; useful to wildlife.

Ascochyta sorghina Sacc., rough leaf spot. Ga., La., N.C.
Bacillus sorghi Burr., (*Bacterium andropogoni* E.F.Sm.): SEE *Pseudomonas andropogoni.*
Cercospora sorghi Ell. & Ev., leaf spot. Gulf States, Kans., Nebr., S.Dak., Tenn.
Colletotrichum spp., anthracnose. N.C. to Fla., Tex., and Ind.; P.R. Reported as *C. falcatum* Went, *C. lineola* Cda., and *C. graminicola* (Ces.) G.W.Wils.; perhaps the forms on *Sorghum* are best referred to the latter species and appear to be specialized for this host.
Cuscuta sp., dodder. Tex.
Gibberella zeae (Schw.) Petch, on culms. Ga.
Gloeocercospora sorghi D.Bain & Edg., zonate leaf spot. La., Miss.
Helminthosporium sorghicola Lefebvre & Sherwin, leaf spot. Ga., Tex.
H. turcicum Pass., leaf blight. N.C. and Ohio to Ala. and Tex.
Ophiobolus implexus Ell. & Ev., on culms. La.
Phyllosticta sorghina Sacc., leaf spot. Miss., Tex.
Pseudomonas andropogoni (E.F.Sm.) Stapp, bacterial stripe. Ark., Kans., La., Miss., Mo., N.Mex., Tex. Records of *Bacillus sorghi* Burr. probably belong here for the most part; additional localities thus reported are Iowa, Nebr., Utah, Wash.
P. syringae van Hall (*P. holci* Kendr.), bacterial eyespot. Iowa, N.Dak.
Puccinia purpurea Cke. (II,III), leaf rust. S.C. to Fla., Tex., and Okla.; Calif., P.R., T.H. O and I unknown.
Ramulispora sorghi (Ell. & Ev.) L.S. Olive & Lefebvre (*Titaeospora andropogonis* (Miura) Tai), leaf spot. Ala., La., Miss., N.C.
Septoria pertusa Heald & Wolf, leaf blight. Tex.
Sphacelotheca holci Jacks., kernel smut. Ark., Okla., Tenn., Tex. *S. cruenta* (Kuehn) Potter also is reported on this host in Ariz., Calif., Tex., and Utah but is perhaps confused with *S. holci*, which is the commonly occurring loose smut on this species.
S. sorghi (Lk.) Clint., covered kernel smut. Ariz., Calif., Ind., Kans., N.Mex., S.Dak., Tex., Wash. This has also been called *Cintractia sorghi* (Lk.) Hirsch.
Uromyces andropogonis Tracy (II,III), rust. Tenn. O and I on *Viola* spp.
Xanthomonas holcicola (Elliott) Starr & Burkh., bacterial streak. Tex.

Sorghum vulgare Pers., sorghum

Robust annual, cultivated since prehistoric times for grain, sirup, and forage. The numerous forms fall into several major groups to which botanical names have been applied; the groups are connected by intergrading forms and are not consistently separated. In the following list the grain sorghums (kafir, feterita, shallu, milo) have been grouped together in one section; the other groups (sorgho, broomcorn, Sudan grass) are each listed separately.

Sorghum vulgare, grain sorghums

Includes var. *caffrorum* (Thunb.) Hubb. & Rehder, kafir; var. *durra* (Forsk.) Hubb. & Rehder, durra, feterita; var. *roxburghii* (Stapf) Haines, shallu; var. *subglabrescens* (Steud.) A. F. Hill, milo.

Alternaria sp., secondary leaf spot, seedling blight. Ark., Tex., Utah. *Macrosporium ornatissimum* Ell. & Barth. reported "on leaves" or sometimes as "leaf spot" in Kans., Minn., and N.Y. is probably a form of *A. tenuis* Nees ex Cda.
Ascochyta sorghi Sacc., leaf spot. S.Dak. *A. sorghina* Sacc.—N.C. to Fla., La., and Okla. Perhaps a developmental stage of *Phyllosticta sorghina* Sacc. and *Sphaerella ceres* Sacc.
Aspergillus spp., head mold, seed rot, secondary seedling blight. Cosmopolitan.
Bacillus sorghi Burr.: SEE *Pseudomonas andropogoni, P. syringae,* and *Xanthomonas holcicola;* these organisms separately or mixed cause "bacterial blight."
Cercospora sorghi Ell. & Ev., gray leaf spot. Va. to Fla. and Tex.; occasional in Mo., Iowa, S.Dak.
Cladosporium herbarum Pers. ex Lk., leaf mold. Cosmopolitan.
Colletotrichum spp., anthracnose, red spot, stalk rot, seedling blight. General, especially in the Southern States. Usually identified in the South as *C. falcatum* Went, the conidial stage of *Physalospora tucumanensis* Speg.; in the Central and Northern States as *C. graminicola* (Ces.) G.W.Wils., or *C. lineola* Cda. (a name of doubtful standing). Perhaps 2 or more races of navicular-spored *Colletotrichums* occur on this host; those of *C. falcatum* type on this host physiologically different from that on sugarcane.
Corethropsis sp., head mold. Ga.
Curvularia sp., secondary leaf spot, head mold. Ga.
Diplodia natalensis P.Evans (*Physalospora rhodina* (Berk. & Curt.) Cke.?), seedling blight. Tex.
Fusarium spp., head mold, seed rot, seedling blight, root and stalk rot. Cosmopolitan. Specific identification often lacking or doubtful, but the following reported: *F. culmorum* (W.G.Sm.) Sacc., *F. equiseti* (Cda.) Sacc., *F. oxysporum* Schlecht., *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr. SEE ALSO *Gibberella.*
Gibberella fujikuroi (Saw.) Wr. (*Fusarium moniliforme* Sheldon), seed rot, seedling blight, stalk rot (?secondary). Calif., Ga., Kans., Okla., N.Dak., Tex.
G. zeae (Schw.) Petch, head mold, stalk rot. Ga.
Gloeocercospora sorghi D.Bain & Edg., zonate leaf spot. Fla., Ga., La., Miss., Tex.
Helminthosporium sativum Pam., King, & Bakke, root rot. Minn., N. Dak., Okla.
H. sorghicola Lefebvre & Sherwin, target spot. La., N.C. Other species reported as causing or associated with leaf spots are: *H. sorghi* Schw. (now indeterminable)—Pa.; *H. cookei* Sacc.—N.C.; *H. rostratum* Drechs.—Fla.
H. turcicum Pass., leaf blight. General in Southeastern and Gulf States; also reported in Kans., Mo., and Wis.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Heterosporium variabile Cke., leaf mold. Oreg.
Macrophomina phaseoli (Maubl.) Ashby, charcoal stalk rot, dry root rot, ?seedling blight. General in warm regions, reported from Md. to Ga., Calif., and Nebr.
Meloidogyne sp., root knot nematodes. T.H.
Nigrospora sphaerica (Sacc.) Mason, secondary stalk rot, "shredding." Calif.
Penicillium spp., seed mold. Ark., Tex. *P. oxalicum* Currie & Thom, seed rot. Md.
Periconia circinata (Mangin) Sacc., milo disease, root rot. Calif., Kans., N.Mex., Okla., Tex. *P. macrospinosa* Lefebvre, A.G.Johnson & Sherwin, on roots. Kans.
Phoma sp., seedling blight, root rot (? secondary). Ark., Okla.
Phyllosticta sorghina Sacc., leaf spot. Fla., La., Mo., Okla., Tex.
Pseudomonas andropogoni (E.F.Sm.) Stapp, bacterial

stripe. General in the Central States to Ala. and Tex.; also reported in Conn., Va., Ariz., N.Mex., and Calif.

Pseudomonas lapsa (Ark) Starr & Burkh., bacterial stalk rot. Calif.

P. syringae v. Hall (*P. holci* Kendr.), bacterial eyespot. Ind. to Miss., Ariz., and Mont., most frequent in the northern Plains States.

Puccinia purpurea Cke. (II,III), leaf rust. General in the U.S., also T.H. and throughout the West Indies.

Pythium spp., root rot, seedling blight. Widespread but most frequent in the southern Plains States to Tex. and Calif. *P. arrhenomanes* Drechs. has been considered the most prevalent cause of sorghum root rot and has been so reported in Ark., Calif., Colo., Kans., Nebr., N.Mex., N.Dak., Okla., and Tex.; was formerly considered the specific pathogen of milo disease, but see *Periconia*. Other species identified: *P. debaryanum* Hesse—N.Dak.; *P. graminicola* Subr.—Iowa; *P. ultimum* Trow— Calif., Mo.

Ramulispora sorghi (Ell. & Ev.) L.S.Olive & Lefebvre, leaf spot, sooty stripe. Ala., Ark., Fla., Ga., La., Miss., Okla.

Rhizoctonia solani Kuehn, seedling blight, root and stalk rot, leaf-sheath rot. Reported in Iowa, Okla., Tex.; doubtless general but usually considered a minor pathogen of sorghum.

Sclerospora graminicola (Sacc.) Schroet., downy mildew. Iowa.

Sclerotinia sclerotiorum (Lib.) d By., culm rot. Calif.

Sclerotium bataticola Taub.: See *Macrophomina phaseoli*.

Sclerotium rolfsii Sacc., southern sclerotial rot. Ga., La., Tex.

Sphacelotheca cruenta (Kuehn) Potter, loose kernel smut. Widespread in the Central and Southern States to Calif., but infrequent except on kafir and milo varieties.

S. reiliana (Kuehn) Clint., head smut. Central and Southern States to Calif. and Wash.; occasional in the East.

S. sorghi (Lk.) Clint., covered kernel smut. General. This has also been called *Cintractia sorghi* (Lk.) Hirsch.

Spicaria elegans (Cda.) Harz. var. *sorghina* Sacc. is probably *Fusarium moniliforme*.

Titaeospora andropogonis (Miura) Tai: See *Ramulispora sorghi*.

Trichothecium roseum Lk. ex. Fr., head mold. Kans.; probably cosmopolitan.

Tylenchus spiralis Cassidy, root nematode. T.H.

Xanthomonas holcicola (Elliott) Starr & Burkh., bacterial streak. Ariz., Ark., Iowa, Kans., Minn., Mont., Nebr., N.Mex., Okla., Tex., Va.

Mosaic—virus (*Marmor sacchari* Holmes, Saccharum virus 1 K.M.Sm.) La., T.H. Also on *Sorghum virgatum* (Hack.) Stapf. in Hawaii.

Chlorosis—in part mineral deficiency associated with alkaline soil. Ariz., Kans., Okla., Oreg., Tex. In part genetic ("zebra" stripe). Kans.

Headless—genetic abnormality causing barren stalks. ?Kans.

Weak neck—genetic abnormality in certain varieties, especially milo.

Stalk rot. See *Colletotrichum, Fusarium, Macrophromina, Rhizoctonia*.

Sorghum vulgare var. *saccharatum* (L.) Boerl., sorgho, sweet sorghum.

Grown chiefly in the Southern States, Texas, and Kansas, and occasionally in the Central and Eastern States and California. Some sorgho records are included in the preceding section.

Ascochyta sorghina Sacc., leaf spot. Fla., Miss.

Colletotrichum falcatum Went, red rot. Fla., La., Miss., ?Tex., perhaps widespread.

C. graminicola (Ces.) G.W.Wils. (*C. lineola* of authors), anthracnose. N.J., Tenn., Tex., Va., probably general except in South. See note on *Colletotrichum* spp. in preceding section.

Gloeocercospora sorghi D.Bain & Edg., zonate leaf spot. Fla., La.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. T.H.

Phyllosticta sorghina Sacc., leaf spot. Ark., Kans., La., Miss., Mo., Tex. Includes reports of *Phoma insidiosa* Tassi.

Pseudomonas andropogoni (E.F.Sm.) Stapp, bacterial stripe. Kans., Minn., probably general in the Central States.

P. syringae v. Hall, bacterial eyespot. Central States to Miss., Ark., and N.Dak.

Puccinia purpurea Cke. (II,III), leaf rust. General.

Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, secondary root rot. Minn., Nebr., N.Dak., S.Dak.

Sphacelotheca cruenta (Kuehn) Potter, loose kernel smut. Occasional in Central and Southern States.

S. reiliana (Kuehn) Clint., head smut. Calif., Kans., Minn., Utah, Va., Wis.

S. sorghi (Lk.) Clint., covered kernel smut. Calif., Colo., Ga., Iowa, Kans., Minn., Mo., Pa., Tex., Utah, Wash., Wis.

Xanthomonas holcicola (Elliott) Starr & Burkh., bacterial streak. Kans.

Sorghum vulgare var. *sudanense* (Piper) Hitchc., Sudan grass

Cultivated for forage and hay, especially in the South but also in the North Central and Pacific Coast States.

Ascochyta sorghina Sacc., leaf spot. Ga., S.Dak.

Cercospora sorghi Ell. & Ev., gray leaf spot. Gulf States.

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. General except not reported in the Pacific Coast States.

Fusarium spp., root rot, in part secondary. N.Dak., and probably throughout the northern Plains States. The following species identified: *F. equiseti* (Cda.) Sacc., *F. oxysporum* Schlecht., *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr.

Gloeocercospora sorghi D.Bain & Edg., zonate leaf spot. La., Tex., Va.

Helminthosporium sativum Pam., King, & Bakke, root rot. Minn., N.Dak., Va.

H. sorghicola Lefebvre & Sherwin, target spot. Fla., Ga.

H. turcicum Pass., leaf blight. General. Also reported on seed and glumes in La., and associated with root rot in N.Dak.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Macrophomina phaseoli (Maubl.) Ashby, charcoal stem rot. Tex.

Meloidogyne sp., root knot nematodes. Ga.

Phyllosticta sorghina Sacc., leaf spot. Md., Va.

Piricularia grisea (Cke.) Sacc., leaf spot. N.Dak.

Pseudomonas andropogoni (E.F.Sm.) Stapp, bacterial stripe. General in the Central States from Wis. to Miss., Tex., and N.Dak.; also reported in Ariz., Utah, Va., Wash.

P. syringae v. Hall (*P. holci* Kendr.), bacterial eyespot. Central States, Ind. to Tex., Kans., and N.Dak., also Ariz., Mass., N.C., Wash.

Puccinia purpurea Cke. (II,III), leaf rust. La., Okla., Tex., Wis., P.R., T.H.

Pythium sp., root rot. Ga. *P. arrhenomanes* Drechs., root browning. N.Dak. *P. debaryanum* Hesse, root necrosis. N.Dak.
Ramulispora sorghi (Ell. & Ev.) L.S.Olive & Lefebvre, sooty stripe. Fla., Ga., Tex., Va.
Sphacelotheca cruenta (Kuehn) Potter, loose kernel smut. Tex.
S. reiliana (Kuehn) Clint., head smut. Calif., Tex., Wash.
S. sorghi (Lk.) Clint., covered kernel smut. Ariz., Calif., Iowa, Kans., N.C., Nebr., Oreg., Tex., Wash., Wis.
Xanthomonas holcicola (Elliott) Starr & Burkh., bacterial streak. Kans., Mont., Va.

Sorghum vulgare var. *technicum* (Koern.) Jav., broomcorn.

Cultivated chiefly in the West Central States, especially Illinois and Oklahoma, for the panicles used in broom manufacture.

Cephalosporium acremonium Cda., secondary root and stalk rot. Ill.
Cercospora sorghi Ell. & Ev., leaf spot. Ala.
Colletotrichum falcatum Went, red rot. Ill. *C. graminicola* (Ces.) G.W.Wils. (*C. lineola* of authors), anthracnose, root and stalk rot. Conn. to Fla., Tex., and Ill. See note in first section under *Sorghum vulgare*.
Gloeocercospora sorghi D.Bain & Edg., zonate leaf spot. La.
Helminthosporium turcicum Pass., leaf blight. Ill.
Mycosphaerella holci Tehon (*?Sphaerella ceres* Sacc.), on leaves. Ill.
Nigrospora oryzae (Berk. & Br.) Petch, secondary root and stalk rot. Ill.
Phyllosticta sp. (? *P. sorghina* Sacc.), leaf spot. Ill., Mo. Associated with *Mycosphaerella holci*.
Pseudomonas andropogoni (E.F.Sm.) Stapp, bacterial stripe. Ark., Ill., Kans., Tex.
Puccinia purpurea Cke. (II,III), leaf rust. Ill., Kans., La.
Ramulispora sorghi (Ell. & Ev.) L.S.Olive & Lefebvre, sooty stripe. Okla.
Septoria sp., leaf blight. Ill.
Sphacelotheca reiliana (Kuehn) Clint., head smut. Ohio, Tex.
S. sorghi (Lk.) Clint., covered kernel smut. General.

Spartina, cordgrass

I. Salt-Marsh Species, Mostly Coastal

(1) *Spartina alterniflora* Lois., smooth cordgrass.
(2) *S. cynosuroides* Lois., big cordgrass.
(3) *S. leiantha* Benth., California cordgrass.
(4) *S. patens* (Ait.) Muhl., salt meadow cordgrass.

Robust perennial grasses growing in salt marshes along the Atlantic and gulf (1,2,4) or southern Pacific coasts, (4) also sometimes inland to New York and Michigan; useful in erosion control and as wildlife-food plants; (4) is the principal constituent of salt-marsh hay used in packing and mulching.

Claviceps purpurea (Fr.) Tul., ergot. Del., La., Maine, Mass., Miss., N.J., N.Y. (1); Fla., N.Y. (2); Md. (4).
Didymella sp., on culms. La. (2).
Phyllachora diplocarpa Ell. & Ev., tar spot. S.C. (4).
?P. graminis (Pers. ex Fr.) Fckl.—Mass. (1). *P. serialis* Ell. & Ev.—Calif. (3). *P. spartinae* Orton —Fla., Ga., Md. (1).
Phyllosticta sp., on leaves. Md. (2).
Puccinia peridermiospora (Ell. & Tracy) Arth. (II,III), rust. Del., Fla., Mass., Miss., N.C., N.H., Vt. (1); Del., Fla., La., Md., N.J., S.C., (2); Conn., Md., N.J., N.Y. (4). O and I on *Fraxinus* spp.
P. seymouriana Arth. (II,III)—Miss. (1), N.Y. (1,2). O and I on *Apocynum* spp., *Asclepias* spp., and *Cephalanthus occidentalis* L.
Septogloeum spartinae (Ell. & Ev.) Wr., on leaves. Calif. (3).
Septoria sp. (*S. spartinae* (Trel.) Sprague?), on leaves. Md. (2).
Stagonospora sp., on culms. Md. (2).
Tracyella spartinae (Pk.) Tassi, on culms. Miss. (4).
Uromyces acuminatus Arth. (II,III), rust. Conn., Del., Fla., Maine, Md., Mass., N.H., N.J., N.Y. (1,4); Fla. (2). Composed of several races with distinct aecial hosts; the form occurring on the *Spartina* spp. in this range is designated *U. acuminatus spartinae* (Farl.) Arth. with O and I on *Moehringia lateriflora* (L.) Fenz. and *Spergularia* spp.
U. argutus Kern (II,III)—Fla. (1). O and I unknown.

II. Inland Species

(1) *Spartina gracilis* Trin., alkali cordgrass.
(2) *S. pectinata* Link, prairie cordgrass.

Tall perennial grasses: (1) on alkaline plains from North Dakota and Nebraska to California and Washington; (2) in fresh water marshes from Maine to North Carolina, Texas, and Oregon; useful to wildlife.

Ascochyta spartinae Trel.: SEE *Septoria spartinae*.
Claviceps purpurea (Fr.) Tul., ergot. Mont., Okla., S.Dak. (2).
Mycosphaerella sp. (*Sphaerella spartinae* Ell. & Ev.), on leaves and sheaths. Nebr. (2).
Phyllachora sp., tar spot. Minn. (2).
Puccinia distichlidis Ell. & Ev. (II,III), rust. Mont., Nebr., S.Dak., Wyo. (1); N.Y. to Okla., Colo., and Mont. (2). O and I on *Glaux maritima* L. and *Steironema ciliatum* (L.) Raf.
P. peridermiospora (Ell. & Tracy) Arth. (II,III)—Kans., N.Dak., Nebr., Okla., S.Dak., (1); Maine to Miss., Okla., and N.Dak. (2).
P. seymouriana Arth. (II,III)—Mass. to Ind., Okla., and Mont. (2).
Scolecotrichum graminis Fckl., brown stripe. Oreg. (1).
Septoria spartinae (Trel.) Sprague, leaf spot. Utah (1); Iowa, S.Dak., Wis. (2).
Uromyces acuminatus Arth. (II,III), rust. Mont., N.Dak., Wyo. (1); N.Y. to Ind., Colo., and Mont. (2). Three races differing in aecial hosts have been identified: *U. acuminatus magnatus* (Arth.) J.J. Davis with O and I on Convallariaceae. *U. acuminatus polemonii* (Pk.) J.J.Davis with O and I on Polemoniaceae, and *U. acuminatus steironematis* (Arth.) J.J.Davis with O and I on Primulaceae.

Sphenopholis, wedgegrass, wedgescale

(1) *S. intermedia* Rydb., slender wedgegrass.
(2) *S. obtusata* (Michx.) Scribn., prairie wedgegrass.
(3) Other species.

Perennial grasses of prairies, old fields, and open woods: (1) and (2) nearly throughout the United States, other species mostly in the East and South; of minor forage value.

Cercospora agrostidis Atk., leaf spot. N.Dak. (2).

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. N.Dak. (2).
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail, choke. Ga., Miss., N.C. (2); Md., Ohio (3).
Erysiphe graminis DC., powdery mildew. Iowa (2).
Puccinia eatoniae Arth. (II,III), rust. W.Va. (1); N.Y. to Fla., Okla., and N.Dak. (2,3); N.Mex. (3). Composed of 2 races, *ranunculi* Mains, with O and I on *Ranunculus* spp., and *myosotidis* Mains, with O and I on *Myosotis virginica* (L.) B.S.P.
P. graminis Pers. (II,III), stem rust. Calif., Kans., La., N.Dak. (2). The f. sp. *avenae* Eriks. & E. Henn. identified.
Sclerotium rhizodes Auers., leaf rot Wis. (2).
Selenophoma everhartii (Sacc. & Syd.) Sprague & A.G. Johnson, speckle. N.Dak. (2).
Septoria andropogonis J.J.Davis, leaf spot. N.Dak. (2). *S. quinqueseptata* Sprague—N.Dak. (2).

Sporobolus, dropseed

I. *Sporobolus airoides* and Related Species, Western Bunchgrasses

(1) *S. airoides* Torr., alkali sacaton.
(2) *S. cryptandrus* (Torr.) A.Gray, sand dropseed.
(3) *S. flexuosus* (Thurb.) Rydb., mesa dropseed.
(4) *S. giganteus* Nash, giant dropseed.
(5) *S. wrightii* Munro, sacaton.
(6) Other species.

Anguina sp., inflorescence gall. Okla. (1), Kans. (2), Tex. (3).
Ascochyta stipae Died., leaf spot. Wash. (1), Calif. (6).
Corynebacterium agropyri (O'Gara) Burkh., bacterial spot. N.Dak. (1,2).
Erysiphe graminis DC., powdery mildew. Ariz. (4).
Fusarium spp., secondary root rot: *F. oxysporum* Schlecht. and *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr. noted. N.Dak. (2).
Hendersonia simplex Schroet., leaf mold. Wash. (1).
Macrophoma sporoboli Sprague, on dead leaves. Ariz. (4), N. Mex. (on *S.* sp.).
Phyllachora vulgata Th. & Syd., tar spot. Colo. (1); Kans., Tex. (2); Wis. (2,6).
Puccinia graminis Pers. (II,III), stem rust. Colo., Kans., N.Dak., S.Dak., Tex., (2). The f. sp. *secalis* and *tritici* Eriks. & E Henn. have been identified.
P. luxuriosa Syd. (II,III), leaf rust. Nebr. to Okla., Calif., and Oreg. (1). O and I on *Sarcobatus vermiculatus* (Hook.) Torr.
P. schedonnardi Kell. & Swing. (II,III)—N.Dak., S.Dak., Wyo. (1); Tex (6). O and I on Malvaceae.
P. simulans (Pk.) Barth.—Wis. to Tex., Ariz., and Idaho (2); Ariz. (5); Colo., N.Mex. (6).
Pythium monospermum Pringsh., root necrosis. S.Dak. (2).
?*Rosellinia* sp., on dead culms, together with a mold doubtfully identified as *Lacellina libyca* Sacc. & Trott. Tex. (5).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, speckle. Idaho, N.Dak. (2), Ariz. (4).
Sphacelotheca utahensis Zundel, seed smut. Utah (1).
Uredo egenula Arth. (II), rust. Tex., (on *S. argutus* (Nees) Kunth.)
Uromyces sporoboli Ell. & Ev. (II,III), leaf rust. Iowa, S.Dak. (2).
Ustilago hypodytes of Amer. authors, ?(Schlecht.) Fr., stem smut. Colo. (2).
BENDS (hairpin)—cause unkown. Wash. (1).

II. *Sporobolus asper* and Related Species

(1) *S. asper* (Michx.) Kunth., tall dropseed.
(2) *S. clandestinus* (Spreng.) Hitchc.
(3) *S. gracilis* (Trin.) Merr.
(4) *S. heterolepis* A.Gray, prairie dropseed.

Perennial bunchgrasses: (1) and (4) on prairies and sandy fields from the Northeastern and Central States to the Rocky Mountains, (2) chiefly in Eastern and Southern States, (3) on pine barrens in the Southeastern States; useful to wildlife.

Cercospora seriata Atk., leaf spot. Ala. (1).
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Okla. (2), N.Dak. (4).
Hendersonia simplex Schroet., leaf mold. Wash. (1).
Hysterographium hysterioides (Ell. & Ev.) Wehm., on dead culms. Kans. (1).
Hysteropezizella andropogonis (Berk. & Curt.) Nannf., on dead culms. Ga. (2).
Phyllachora vulgata Th. & Syd., tar spot. Ill. (1).
Puccinia graminis Pers. (II,III), stem rust. Ala., Ill. (1).
P. sporoboli Arth. (II,III), leaf rust. Iowa, Nebr., N. Dak. (1,4). O and I on *Lilium umbellatum* Pursh, and also *Allium* spp. in cultures.
P. vilfae Arth. & Holw. (II,III)—Wis. to Ala., Okla., and S.Dak. (1). O and I on *Verbena* spp.
Scirrhia sporoboli Atk., on culms. Ala. (1).
Selenophoma donacis (Pass.) Sprague & A.G.Johnson var. *stomaticola* (Baeumler) Sprague & A.G.Johnson, speckle. Iowa, Mont., N.Dak., Wis. (1); Okla. (2).
Septoria andropogonis J. J. Davis f. *sporobolicola* Sprague, leaf blotch. N.Dak. (4).
Stagonospora subseriata (Desm.) Sacc., leaf mold. N.Dak. (4).
Uromyces sporoboli Ell. & Ev. (II,III), leaf rust. Kans., S.Dak., Tex. (1). O and I on *Allium* spp.
Ustilago sporoboli Tracy & Earle, seed smut. Miss. (3).
Volutella bartholomaei Ell. & Ev., on leaves. Kans.
BENDS—cause unknown. Wash. (1).

III. *Sporobolus* spp., Miscellaneous

(1) *S. indicus* (L.) R.Br., West Indies smutgrass.
(2) *S. neglectus* Nash
(3) *S. poiretii* (Roem. & Schult.) Hitchc., smut grass.
(4) *S. vaginiflorus* (Torr.) Wood, poverty dropseed.
(5) *S. virginicus* (L.) Kunth., seashore dropseed.

Perennial (1,3,5) or annual (2,4) grasses, mostly in dry sandy fields or in saline marshes (5): (1) in tropical America; (2) and (4) throughout the Eastern and Central States; and (3) and (5) in the Southeastern States; useful to wildlife.

Balansia epichloë (Weese) Diehl, black ring, sterility disease. Ala., Miss. (1); Va. to Fla., La., and Ark. (3).
Curvularia geniculata (Tracy & Earle) Boed., leaf mold, secondary root rot. N.Dak. (2).
Helminthosporium ravenelii Curt., false smut. Characteristically overgrowing the inflorescence, perhaps associated with the mucilaginous pericarp, and in turn often overgrown with molds as *Tricothecium helminthosporii* (Thuem.) Sacc.; its presence gives

the grass its common name. P.R., T.H. (1); Wis. (2); general (3).
Phyllachora vulgata Th. & Syd., tar spot. Kans. (2).
Puccinia vilfae Arth. & Holw. (II,III), rust. Nebr. (2).
Tolyposporella sporoboli Jacks., leaf smut. P.R. (1).
Uromyces ignobilis (Syd.) Arth. (II,III), rust. C.Z., P.R. (1). O and I unknown.
U. sporoboli Ell. & Ev. (II,III), rust. Iowa, Kans., Nebr., S.Dak. (2,3); P.R. (5).
Ustilago vilfae Wint., seed smut. Iowa, Kans., Nebr., Pa., Wis. (2,4).

Stenotaphrum

S. secundatum (Walt.) Kuntze, St. Augustine grass

Creeping perennial of seacoast areas from South Carolina to Florida, Texas, and southward; used for lawns and pastures. A variegated form designated as var. *variegatum* Hitchc. is grown for ornament.

Helminthosporium sp., foot rot. La., Tex.
Himantia stellifera J.R.Johnston, on stolons. P.R.
Meliola stenotaphri F.L.Stev., black mildew. P.R.
Nigrospora sphaerica (Sacc.) Mason, secondary leaf spot. Fla.
Piricularia grisea (Cke.) Sacc., leaf spot. Fla., Tex.
Physarum cinereum (Batsch) Pers., slime mold. Fla., Tex.
Rhioctonia oryzae Ryker & Gooch, leaf spot. Fla.
R. solani Kuehn, brown patch. Tex.
Uromyces ignobilis (Syd.) Arth. (II,III), rust. P.R.
Ustilago affinis Ell. & Ev., inflorescence smut. P.R.

Stipa, needlegrass

(1) *S. columbiana* Macoun, Columbia needlegrass.
(2) *S. comata* Trin. & Rupr., needle-and-thread.
(3) *S. lettermani* Vasey, Letterman needlegrass.
(4) *S. leucotricha* Trin. & Rupr., Texas needlegrass.
(5) *S. occidentalis* Thurb., western needlegrass.
(6) *S. pulchra* Hitchc., purple needlegrass.
(7) *S. spartea* Trin., porcupinegrass.
(8) *S. viridula* Trin., green needlegrass.
(9) Other species.

Numerous species of perennial bunchgrass occurring mostly on dry plains and foothills of the Far Western States; (2,7, and 8) also extending into the North Central States but only one, *S. avenacea* L., in the East and South. Most species are acceptable forage grasses when young, but when mature the awns of some (2,7) are injurious to livestock; *S. robusta* Scribn., sleepygrass, is reputedly narcotic. Several species furnish food for wildlife.

Anguina graminis (Hardy) Filip., nematode gall of seed. Calif. (5).
Aphanomyces sp., root necrosis. N.Dak. (8).
Ascochyta graminicola Sacc. var. *brachypodii* Sacc., leaf spot. Mont. (2); Minn., N.Dak. (8); Oreg. (5).
A. hordei Hara—Colo. (9).
A. stipae Died.—Calif., Oreg. (9).
Atkinsonella hypoxylon (Pk.) Diehl (*Balansia hypoxylon* (Pk.) Atk.), black choke. Tex. (4,8).
Cladosporium graminum Pers. ex Lk., leaf and head mold. N.Dak. (8).
Claviceps purpurea (Fr.) Tul., ergot. Ind., Utah, Wash. (1); Wash. (3); Minn., N. Dak. (8); Mont. (9).
Corynebacterium agropyri (O'Gara) Burkh., bacterial spot. Calif. (9).
Curvularia geniculata (Tracy & Earle) Boed., secondary root rot. N.Dak. (2,8).
Epichloë typhina (Pers. ex Fr.) Tul., choke, cat-tail. ?S.Dak. (9).
Epicoccum neglectum Desm., leaf mold. Nebr. (2).
Fusarium spp., secondary root rot; the following species identified: *F. equiseti* (Cda.) Sacc.—N.Dak. (2,7, 8); *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr.—N.Dak (2,8).
F. nivale (Fr.) Ces., pink snow mold. Calif., Wash. (1); Calif. (2); Wash. (9).
Helminthosporium sp., leaf spot. Minn. (7); Ky., Wash. (9).
H. sativum Pam., King, & Bakke, root rot. Minn., N.Dak., S.Dak (2,7,8,9).
Pseudomonas coronafaciens (Elliott) F.L.Stevens var. *atropurpurea* (Reddy & Godkin) Stapp, chocolate spot. Mont., Nebr., S.Dak., Wyo. (2); Mont., N. Dak., S.Dak. (8); Calif., N.Dak., Nev., Wash. (9).
Puccinia graminella (Speg.) Diet. & Holw. (I,III), leaf rust. Calif. (on *S. lepida* Hitchc., in 1894; not found since).
P. graminis Pers. (II,III), stem rust. Wash. (2), Calif. (6,9). The f. sp. *tritici* Eriks. & E. Henn. identified.
P. interveniens (Pk.) Bethel (II,III), leaf rust. Colo., Utah (1); Colo., Mont., Wyo. (2); Colo. (3); Ariz., Calif. (9). O and I on Malvaceae.
P. monoica (Pk.) Arth. (II,III)—Calif. (5), Nev. (9). O and I on *Arabis* and other Cruciferae.
P. scaber (Ell. & Ev.) Barth. (II,III)—Colo., Idaho, Minn., Wyo. (1); Mont. (2); Colo., N.Mex., Utah (3); Wyo. (5); Minn. to N.Mex. and Mont. (8); Idaho, Oreg. (9); also on other species in this range. O and I unknown.
P. stipae Arth. (II,III)—Calif. (1,7,9); N.Dak. to Ariz. and Wash. (2); Wis. to Colo. and N.Dak. (7); also on other species in this range. O and I on Compositae.
P. windsoriae Schw. (II,III)—Va. (2). O and I on *Ptelea trifoliata* L.
Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, pink root. Minn., N.Dak., S.Dak. (2,7,8).
Pythium arrhenomanes Drechs., root browning. N.Dak. (2,7,8). *P. debaryanum* Hesse, damping-off. N.Dak. (8).
Rhizoctonia solani Kuehn, secondary root rot. N.Dak. (2,8,9); Nebr. (7); S.Dak. (8).
Scolecotrichum graminis Fckl., brown stripe. Reported from S.Dak. to Oreg. and Wash. (1,2,3,5,8,9); probably general.
Selenophoma donacis (Pass.) Sprague & A.G.Johnson, speckle, leaf spot. Nebr., Wyo. (2); Mont., N.Dak., S.Dak. (2,7,8); Wash., Wyo. (9).
S. obtusa Sprague & A.G.Johnson—Wash. (1); Calif., Mont., Wyo. (9).
Septoria andropogonis J. J. Davis f. *sporobolicola* Sprague, brown blotch. Mont., N.Dak. (2); S.Dak. (8).
S. nodorum Berk., glume blotch. N.Dak. (8).
S. secalis Prill. & Del. var. *stipae* Sprague, white spot. Wash. (1); Minn., N.Dak., S.Dak. (8,9).
S. stipina Died.—Oreg. (1).
Sorosporium granulosum Ell. & Tracy, inflorescence and culm smut. Colo., Mont., Nebr., Wyo. (2); Colo. (8); Oreg. (9).
Stagonospora agrostidis Syd. f. *angusta* Sprague, leaf blotch. N.Dak. (8). *S. simplicior* Sacc. & Berl. var. *simplicior* Sprague—Utah (1).

Tilletia wilcoxiana Griff., seed smut. Calif. (on *S. lepida*).
Urocystis fraserii Clint. & Zundel, stem smut. Mont. (2).
U. granulosa Clint., inflorescence smut. Idaho (2).
Ustilago hypodytes Amer. auths., ?(Schlecht.) Fr., stem smut. Most of the records of stem smut on *Stipa* spp. have been referred to *U. nummularia, U. spegazzinii,* and *U. williamsii* (q.v.), but some specimens not yet critically determined are still retained under this older but doubtful name as applied to American material. Colo., Oreg. (1); Nev., Wash. (2); Ill. (on *S. avenacea*); Calif., Nev., Tex. (on *S. elmeri, S. eminens, S. lemmoni,* and *S. mucronata*).
U. jacksonii Zundel & Dunlap, culm and inflorescence smut. Colo (3).
U. minima Arth., stem smut. Calif., Mont. (2); Ill., Iowa, S.Dak. (7); Ariz., Colo. (9).
U. nummularia Speg.—Calif., Mont., Okla., Oreg., S. Dak., Wash., Wyo. (2); N.Mex. (9).
U. spegazzinii Hirsch.—Tex. (4); Ill., Iowa, Wis. (7); Mont., N.Dak., S.Dak. (8); N.Mex. (9).
U. spegazzinii var. *agrestis* (Syd.) G.W.Fisch. & Hirsch. —Calif. (5,6,9); Ill. (7); N.Dak. (8).
U. williamsii (Griff.) Lavrov—Calif., Mont., Oreg., Wash. (2,9); Wyo. (3); Calif., Oreg. (5); Calif. (6); Mont. (8).
Wojnowicia graminis (McAlp.) Sacc. & D.Sacc., secondary culm rot. Minn., Oreg. (9).
BENDS (hairpin)—cause unknown. Calif. (1); Wash. (3).

Trichachne

(1) *T. californica* (Benth.) Chase, cottontop.
(2) *T. insularis* (L.) Nees, sourgrass.

Perennial grasses: (1) on dry plains in the Southwest, (2) in low waste ground in the West Indies and Gulf Coast States; (1) is of minor forage value; useful to wildlife.

Phyllachora insularis Chardon, tar spot. P.R. (2); Tex. (on *T. patens* Swallen).
Puccinia atra Diet. & Holw. (II,III), rust. Ariz., N.Mex., Tex. (1); P.R. (2). O and I unknown.
P. substriata Ell. & Barth. (II,III)—P.R. (2). O and I on *Solanum* spp.
Sphacelotheca cordobensis (Speg.) Jacks., inflorescence smut. Ariz. (1); P.R., V.I. (2).
MOSAIC—virus (? *Marmor sacchari* Holmes, Saccharum virus 1 K.M.Sm.). T.H. (2).

Tricholaena

T. repens (Willd.) Hitchc. (*T. rosea* Nees), Natal grass.

Annual of South Africa, cultivated for hay in Florida, and naturalized in dry plains and woods near the Gulf Coast States and in tropical America.

Cerebella andropogonis Ces., head mold, probably secondary to ergot, *?Claviceps purpurea* (Fr.) Tul., reported only in the conidial stage as *Sphacelia* sp., on this host.
Heterodera marioni (Cornu) Goodney: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla., T.H.
Phyllostict sorghina Sacc., leaf spot. Wash.
Puccinia levis (Sacc. & Bizz.) Magn. (II,III). rust. Fla.

Triodia

(1) *T. flava* (L.) Smyth, purpletop.
(2) Other species.

Perennial grass of old fields and open woods ranging from Massachusetts to Florida, Texas, and Nebraska; useful to wildlife.

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Ala. (1).
Mycosphaerella crus-galli (Ell. & Kell.) Lindau, on dead leaves. N.Y. (1).
Periconia lateralis Ell. & Ev., on culms. Nebr. (1).
Phyllachora eragrostidis Chardon, tar spot. Ga., Tex. (1); N.Mex., Tex. (on *T. albescens* Vasey).
Puccinia graminis Pers. (II,III), stem rust. Ala. (1).
P. simulans (Pk.) Barth. (II,III), rust. Tex. (on *T. stricta* (Nutt.) Benth.). O and I unknown.
P. windsoriae Schw. (II,III)—N.J. to Ala., Tex., and N.Dak. (1); Tex. (2). O and I on *Ptelea trifoliata* L.
Stagonospora paspali Atk., leaf spot. Va. (1).
Ustilago tricuspidis Ell. & Gall., seed smut. Mo., W.Va. (1).
U. hieronymi Schroet., leaf smut. Ariz., N. Mex. (on *T. pulchella* H.B.K.).

Triplasis, sandgrass

(1) *T. americana* Beauv., perennial sandgrass.
(2) *T. purpurea* (Walt.) Chapm., purple sandgrass.

Perennial (1) or annual (2) grasses of sandy fields and waste ground: (1) in the Southeastern States, (2) in the Central and Eastern States; useful in erosion control and to wildlife.

Puccinia schedonnardi Ell. & Barth. (II,III), leaf rust. Kans., Okla., Tex. (2). O and I on Malvaceae.
Ustilago triplasidis Ell. & Ev., inflorescence smut. Fla., Miss., S.C. (1).
U. sieglingiae Ricker—Fla., Ill., Iowa, N.C. (2).

Tripsacum, gamagrass

(1) *T. dactyloides* L., eastern gamagrass.
(2) Other species.

Tall perennial, occasional in meadows and moist habitats from Massachusetts to Florida, Texas, Nebraska, and Michigan; of minor forage value; useful to wildlife.

Bacterium stewartii E.F.Sm., bacterial wilt. Tex., Va. (1).
Claviceps purpurea (Fr.) Tul., ergot. Miss., Okla. *C. tripsaci* F.L.Stevens & J.G.Hall—Md., Ga., Miss., N.C., Va. (1).
Colletotrichum graminicola (Ces.) G.W. Wils., anthracnose. N.Y., S.C., Va. (1).
Epicoccum neglectum Desm., leaf mold. Miss. (1).
Puccinia polysora Underw. (II,III), rust. Ala., Fla., Iowa, N.C., N.J., Tex., Va. (1); Va. (2). O and I unknown.
P. tripsaci Diet. & Holw. (II,III), rust. Ind., Kans., Md., Miss., Mo., N.C., Nebr., Tex. O and I on *Ceanothus* spp.
Ramularia carniformis (Ell. & Tracy) Sherb., head mold. Miss.

Trisetum

(1) *T. canescens* Buckl.
(2) *T. cernuum* Trin.
(3) *T. spicatum* (L). Richt.

Mostly perennial bunchgrasses of arctic plains and mountain meadows: (1) and (2) in

the Pacific Northwest, (3) in the Northeastern States at high altitudes westward to the Pacific Northwest and Alaska; useful for forage and wildlife.

Ascochyta sorghi Sacc., leaf spot. Idaho (1).

Cladosporium graminum Pers. ex Lk., leaf mold. Wash. (1).

Claviceps purpurea (Fr.) Tul., ergot. Idaho (1).

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Oreg. (2); Mich.

Fusarium scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. Wash. (2).

Hendersonia culmicola Sacc., leaf mold. Mont. (3).

Lophodermium arundinaceum Schrad. ex Chev., on dead leaves and stems. Calif. (3).

Mastigosporium rubricosum (Dearn. & Barth.) Sprague, red eyespot. Oreg. (2).

Ovularia pusilla (Ung.) Sacc. & D.Sacc., leaf spot. Wyo. (3).

Pseudomonas coronafaciens (Elliott) Stapp, bacterial blight. Calif. (3).

Puccinia coronata Cda. (II,III), crown rust. Oreg. (1, 2); Calif., Wash. (2); Colo. (3).

P. glumarum (Schm.) Eriks. & E. Henn. (II,III), stripe rust. Wash. (2).

P. graminis Pers. (II,III), stem rust. Calif., Idaho, Mont., Oreg. (1). The f. sp. *avenae* Eriks. & E.Henn identified.

P. monoica (Pk.) Arth. (II,III), rust. Colo., Utah, Wash. (3). O and I on Cruciferae.

P. poae-sudeticae (West.) Jørst. (II,III), leaf rust. Nev., Wyo. (3). O and I unknown.

P. rubigo-vera (DC.) Wint. (II,III), leaf rust. Calif., Colo., Wash., Wyo. (3). Reported as var. *agropyri* (Eriks.) Arth. in Colo.

Scolecotrichum graminis Fckl., brown stripe. Idaho, Mont. (1); N.Y. (3).

Selenophoma everhartii (Sacc. & Syd.) Sprague & A.G. Johnson, leaf and stem speckle. Colo., Mont., Wyo. (3).

Septoria calamagrostidis (Lib.) Sacc., leaf spot. Oreg. (1,2); Calif., Wash. (3).

Triticum

I. Common and Durum Wheats

Triticum aestivum (L.) wheat.

This section includes all records on common (*T. vulgare* Vill.), durum (*T. durum* Desf.), and club (*T. compactum* Host) wheats. Einkorn (*T. monococcum* L.), emmer (*T. dicoccum* Schrank), Polish wheat (*T. polonicum* L.), poulard wheat (*T. turgidum* L), and spelt (*T. spelta* L.) are listed separately, so far as they are distinguished in the records. The principal wheat-producing regions are: (1) the winter-wheat belt extending from Oklahoma and Nebraska to North Carolina and New Jersey; (2) the spring-wheat area of Minnesota and the Dakotas; (3) the Columbia Basin of eastern Washington and adjacent parts of Oregon and Idaho; other important areas are western New York and southern Michigan, the mountain and intermountain region from Idaho and Montana to Utah and Colorado, and the Pacific coast from central California to the Willamette Valley, Oreg.

Alternaria spp., especially *A. tenuis* Nees ex Cda., black point (kernel discoloration), secondary leaf and stem spot, ? seedling blight. General throughout the humid wheat areas, both spring and winter wheat; rare in the Northwest. Often accompanies other agents producing discoloration and superficial necrosis, but *A. tenuis* alone may cause kernel smudge or *Alternaria* blotch. Other species reported are *A. brassicae* (Berk.) Sacc. in N.Y. and *A. peglioni* Curzi in N.Dak.

Anguina tritici (Steinbuch) Filip., head nematode, "cockles." Md. to Ga. and Tenn. Formerly found in Ohio and N.Y. but not reported recently; also in Calif. but thought to be eradicated.

Ascochyta graminicola Sacc., leaf spot. Okla.

Aspergillus spp., mold of grain, seed rot. Cosmopolitan on damaged or immature seed. *A. glaucus* Lk. (group) is reported to be the most prevalent mold of this kind in the spring-wheat area; *A. candidus* Lk., *A. flavus* Lk., and *A. niger* v.Tiegh. are also mentioned in this connection.

Brachycladium spiciferum Bainier, secondary root rot and leaf mold. Spring-wheat region. This has also been referred to *Curvularia* sp. and to *Helminthosporium tetramera.*

Cephalosporium acremonium Cda., associated with seedling root rot. Minn.

Cercosporella herpotrichoides Fron, eyespot foot rot, Columbia Basin foot rot. Idaho, Oreg., Wash.

Cladosporium spp., glume mold, "sooty ear," secondary leaf spot, blackening. Cosmopolitan, but reported chiefly on winter wheat and in wet seasons. *C. herbarum* Pers. ex Lk. or *C. graminum* Cda. (which was preceded by *C. graminum* Pers. ex Lk. and is probably synonymous) are usually cited.

Claviceps purpurea (Fr.) Tul., ergot. Widespread but infrequent, occurs especially on durum wheat in the spring-wheat area.

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. General in humid wheat areas, N.Y. to Ga. and Ill., occasional in Central States, rare or absent westward.

Curvularia geniculata (Tracy & Earle) Boed., leaf mold. N.Dak.

C. inaequalis (Shear) Boed. (*"Helminthosporium M"* Henry), on discolored seed, perhaps a factor in seedling blight. Minn.

Dilophospora alopecuri Fr., twist (spike deformity associated with *Anguina tritici* infestation). S.C.

Epicoccum nigrum Lk. ex Wallr., glume spot, smudge (saprophytic). Del., Ill., Ohio, Pa. Various other names, such as *E. purpurascens* Ehr. and *E. vulgare* Cda., are probably synonymous.

Erysiphe graminis DC., powdery mildew. General. Wheat mildew is commonly designated f. sp. *tritici* Em. Marchal, since it does not attack other cereals, but it has recently been shown to be a complex of physiological races some of which can infect hosts other than *Triticum* spp.

Fusarium arthrosporioides Sherb. and *F. avenaceum* (Fr.) Sacc. (*F. roseum* Lk. emend. Snyd. & Hans.), head mold, root and culm rot. N.Y., Oreg., W.Va., Wis.

F. culmorum (W.G.Sm.) Sacc., root and culm rot, seedling blight. Calif., N.Dak., Oreg., also in the Central and Eastern States, but owing to confusion with *F. graminearum* as the cause of scab, the record of its distribution as a wheat pathogen is uncertain.

F. equiseti (Cda.) Sacc., secondary root rot. Mont., N.Dak., Oreg.

F. graminearum Schwabe: SEE *Gibberella zeae.*

F. moniliforme Sheldon: SEE *Gibberella fujikuroi.*

F. nivale (Fr.) Ces., pink snow mold. Calif., Idaho, Wash. Conidial stage of *Calonectria nivalis* Schaffnit; not reported in U.S.

F. oxysporum Schlecht., secondary root rot, pink mold. N.Dak., Oreg.

Fusarium poae (Pk.) Wr., head mold. Wash.

F. scirpi Lambotte & Fautr., especially the var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N.Dak., Oreg., Wis. Conidial stage of *Gibberella acuminata* Wr.

F. sporotrichioides Sherb., head mold, false scab, "durum blight." Minn., N.Dak., Wyo.

Gibberella fujikuroi (Saw.) Wr. (*G. moniliformis* Wineland), occasionally isolated from seed and diseased roots; some strains shown pathogenic, causing seedling root rot. Specific reports from Ind., Minn., Mo., Tenn.

G. zeae (Schw.) Petch, scab (head blight), root and stem rot, seedling blight. General, except rare in Calif. and the Pacific Northwest. Severe in the spring-wheat area; durum wheats especially susceptible. Sometimes reported as *G. saubinetii* (Mont.) Sacc., which in turn is a synonym of *G. pulicaris* (Fr.) Sacc., but is at least physiologically distinct from these cosmopolitan saprophytes.

Gloeosporium bolleyi Sprague, on roots, ?seed rot, ?secondary root rot. From Minn. and Nebr. to eastern Wash.

Helminthosporium spp., foot rot, root rot, leaf blotch, joint rot, head blight, black point, kernel smudge, seedling blight. Of the various *Helminthosporiums*, named or unnamed, associated with diseased wheat, present evidence indicates that *H. sativum* Pam., King, & Bakke is the most common and widely distributed, no wheat area being free of it, and it may cause any of the types of disease listed. It is regarded as the most prevalent cause of dryland root rot. Occasional reports of other cereal-infecting *Helminthosporium* spp. on wheat are doubtful. The present disposition of certain temporary names or synonyms found in literature is as follows: "*Helminthosporium* M" Henry=*Curvularia ramosa* (Bainier) Boed., perhaps in part *C. inaequalis* (Shear) Boed.; "*Helminthosporium* N" Henry, not further identified. *H. tetramera* McK. has been referred to *Curvularia spicifera* (Bainier) Boed. (=*Brachycladium spicifera* Bainier) but without comparison of type specimens.

H. pedicellatum Henry, root rot. Minn.

H. tetramera McK., root rot. Okla., Tex.

H. tritici-repentis Died. (=*Pyrenophora tritici-repentis* Drechs.), secondary root rot and leaf spot. N.Dak.

H. tritici-vulgaris Nisikado, yellow spot. Ga., Kans., Md., N.C., Nebr., N.Y., Pa., S.C., Va., W.Va.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Heterosporium avenae Oud., leaf and head mold. Wash., Wyo.

Leptosphaeria herpotrichoides De N., on culms. Wash.

L. tritici (Garov.) Pass, leaf spot. Iowa, Nebr., N.Y.

Lophodermium arundinaceum (Schrad. ex Fr.) Chev. var. *culmigenum* (Fr.) Fckl., on old leaves. Kans., Mich., N.Y., Ohio, Pa.

Marasmius tritici P.A. Young, on base of culms, ?foot rot. Ill.

Meloidogyne sp., root knot nematodes. T.H.

Microascus trigonosporus Emmons & B.O.Dodge, on seed. Wis. This fungus, previously known only as a human dermatophyte, is believed to have been only incidentally present on seed.

Mycosphaerella tulasnei (Jancz.) Lindau. Reputed ascigerous stage of *Cladosporium herbarum* (q.v.), known only in artificial cultures.

Naucoria cerealis Boewe, on roots and tillers. Ill.

Nigrospora ? oryzae (Berk. & Br.) Mason, seed mold. Minn.

Ophiobolus graminis Sacc., take-all, foot rot, whiteheads. N.Y. to N.C., Okla., and Nebr.; also Calif., Idaho, Oreg., Wash.

Penicillium spp., blue-mold seed rot, preemergence seedling blight. Cosmopolitan. Occurs on seed damaged in threshing if endosperm is exposed or injured chemically, especially by copper sulfate.

Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Iowa, Mich.

Phytophthora sp. (*?P. cactorum* (Leb. & Cohn) Schroet.), leaf rot. N.Dak., Wash.

Pleospora herbarum (Pers. ex Fr.) Rab., glume spot, leaf and stem mold. Calif., N.Y., Okla., Tex., Utah. SEE ALSO *Stemphylium* and *Pyrenophora*.

Podosporiella verticillata O'Gara, seed rot, ? root rot. Utah. Resembles "*Helminthosporium* N," and *H. cyclops* Drechs. A fungus similar in its conidial stage, designated *Pleosphaeria semeniperda* Brittlebank & Adam, is reported to cause foot rot of wheat in Australia and western Canada.

Pratylenchus pratensis (De Man) Filip., root nematode. Ohio, Va.

Pseudomonas atrofaciens (McCull.) F.L.Stevens, basal glume rot. Chiefly in the Central States from Minn. to Ark. and N.Dak.; also N.Y., Pa., Va., Colo., Mont.

Puccinia glumarum (Schm.) Eriks. & E.Henn. (II,III), stripe rust. Ariz., Calif., Colo., Idaho, Mont., Oreg., Tex., Utah, Wash. O and I unknown. The races on wheat are sometimes designated f. sp. *tritici* Eriks. & E.Henn.; the f. sp. *hordei* Eriks. & E.Henn. also has been reported on wheat; both forms can infect various grasses.

P. graminis Pers. f. sp. *tritici* Eriks. & E.Henn. (II,III), stem rust. General. O and I on *Berberis* and *Mahonia* spp. The physiologic races identified on wheat currently number over 200; barley is the only other cereal that is attacked by this f. sp., but numerous grasses are susceptible. In general club wheats (*T. compactum*) are susceptible; both resistant and susceptible varieties (to different races) occur in common and durum wheats. Stem rust infection also may induce a melanic reaction or brown necrosis in the glumes, with or without floret sterility, and simulating "black chaff" resulting from other causes.

P. rubigo-vera (DC.) Wint. f. sp. *tritici* (Eriks.) Carl. (II,III), leaf rust. General. More than 100 physiologic races have been identified on wheat. O and I produced on *Thalictrum* spp. by artificial inoculation. In general, club and common wheats are susceptible, durum wheats usually resistant.

Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson (*P. graminis* Ell. & Ev.?), pink root, secondary root rot. Calif., Colo., Iowa, Minn., N. Dak., Tex.

Pyrenophora relicina (Fr.) Fckl., on dead culms. Ga., Wash.

P. trichostoma (Fr.) Fckl.—Mich. Also referred to *Pleospora trichostoma* (Fr.) Ces. & DeN. and said to be a generalized species of which various *Helminthosporium* spp. on cereals, e.g. *H. tritici-repentis* Died., are conidial stages and physiologic races.

Pythium spp., seed rot, damping-off, root browning, root rot: Root browning of partly grown plants, especially in the spring-wheat area, is usually attributed to *P. arrhenomanes* Drechs., reported also in Calif., Iowa, Mo., Mont., Nebr., and Wash., or to *P. graminicola* Subr. (Iowa, S.Dak.); seed rot and damping-off to *P. debaryanum* Hesse and *P. ultimum* Trow, common in northern wheat areas from Minn. to Nebr. and Wash. Other *Pythium* spp. reported are: *P. aristosporum* Vanterpool—Mont., N.Dak.; *P. gracile* Schenk—?Mo.; *P. hypogenum* Middleton—N.Dak.; *P. irregulare* Buis.—Minn., N.Dak., Nebr., S.Dak.; *P. mammilatum* Meurs—?Mo.; *P. oligandrum* Drechs.—Tex.; *P. ostracodes* Drechs.—Tex.

Rhizoctonia solani Kuehn, culm canker ("strawbreaker"). N.Dak., Oreg., Wash. Root rot—Ill., Mich., Minn., Utah. White foot rot—Oreg., Wash.

?R. zeae Voorhees, secondary root rot, ? eyespot. N.Dak.

Rhizopus stolonifer (Ehr. ex Fr.) Lind, black mold seed

rot, preemergence seedling blight. Cosmopolitan. Especially on thresher-damaged grain when endosperm is exposed.

Sclerospora macrospora Sacc., downy mildrew. Calif., Ky., N.Y., Tenn.

Sclerotium rolfsii Sacc., leaf-sheath and culm rot. Ala., Ga., Tex., P.R.

Selenophoma donacis (Pass.) Sprague & A.G. Johns., gray leaf spot. Idaho, Wash.

Septoria avenae Frank f.sp. *triticea* Th. Johnson, leaf spot. N.Dak., Wash.

S. nodorum Berk., glume blotch, node canker, Eastern and North Central States, Maine to Ga., Tex., and Mont.; Wash. This is referred to *Stagonospora hennebergii* (Kuehn) Petr. & Syd.

S. tritici Rob. ex Desm., speckled leaf blotch. General in the Central States and Pacific Northwest near the coast, occasional in Calif., Utah, northern Plains; especially on hard red winter varieties and overwintered plants. Reports of *S. graminum* Desm. on wheat probably belong here.

Stemphylium parasiticum (Thuem.) J. A. Elliott (*S. botryosum* Wallr.?), black point, kernel smudge. Minn., Tex., Utah, Wash., ?Okla. SEE ALSO *Pleospora herbarum.*

Tilletia caries (DC.) Tul. (*T. tritici* (Bjerk.) Wint.), rough-spored bunt. General.

T. caries (DC.) Tul. (special race), dwarf bunt. Colo., Idaho, Mont., N.Y., Utah, Wash., Wyo.

T. foetida (Wallr.) Liro (*T. levis* Kuehn, *T. foetens* Berk. & Trel.), smooth-spored bunt. General.

Trichoderma viride Pers. ex Fr., seed mold. Minn.

Trichothecium roseum Lk., pink mold of heads. Kans., Md.

Tylenchus spiralis Cassidy, root nematode. T.H.

Typhula spp., snow scald. Idaho, Mont., Wash. Two species have been distinguished in precise studies. but have been confused in the field: *T. itoana* Imai and *T. idahoensis* Remsberg. First reported as *Sclerotium rhizodes* Auers., a different species, and as *S. fulvum* Fr., probably the sclerotial stage of *T. itoana.*

Urocystis tritici Koern., flag smut. Ill., Kans., Mo., Wash. Morphologically identical with *U. agropyri* (Preuss) Schroet., an earlier name.

Ustilago tritici (Pers.) Rostr., loose smut. General.

Wojnowicia graminis (McAlp.) Sacc. & D.Sacc., secondary root rot, often associated with *Ophiobolus* foot rot. Ark., Calif., Colo., Kans., N.Y., and Pacific Northwest.

Xanthomonas translucens (L.R.Jones, A.G. Johnson, & Reddy) Dows. f. sp. *undulosa* (E.F.Sm., L.R.Jones, & Reddy) Hagb., black chaff, N.Y. to Tex., Colo., and Idaho. General in the winter-wheat and spring-wheat areas, but is only one of several factors, some parasitic and some not, that may cause nearly identical symptoms. SEE ALSO *Alternaria, Helminthosporium, Puccinia graminis tritici,* and *Stemphylium.*

MOSAIC—viruses. Several types have been distinguished, the specific distribution and distinctive names of which are: mosaic-rosette virus (*Marmor tritici* Holmes var. *typicum* McK., Triticum virus 1 K.M. Sm.), in Ill., Ind., Md., N.C., S.C., Va.; prairie wheat yellow-mosaic virus (*M. tritici* var. *fulvum* McK.), in Ill., Ind., Md., N.C., Va.; plains wheat green-mosaic virus (*M. campestre* McK. var *typicum* McK.), in Colo., Kans.; plains wheat yellow-mosaic virus (*M. campestre* var. *galbinum* McK.), in Kans.; bromegrass mosaic virus (*M. graminis* McK) in Kans.; wheat yellow streak-mosaic virus (*M. virgatum* McK. var. *typicum* McK.), in Iowa, Kans., Nebr., Okla.; wheat green streak-mosaic virus (*M. virgatum* var. *viride* McK.), in Kans. Wheat mosaic caused by an unidentified virus has been reported also in Mo. and Nebr., and mosaic diseases of unconfirmed virus nature have been reported in Okla., Tex., and Wash. Wheat has been shown experimentally to be susceptible to the viruses of Agropyron mosaic (*M. agropyri* McK.), and cucumber mosaic (*M. cucumeris* Holmes).

BLACK GLUMES (blackening, false black chaff)—nonparasitic, possibly of genetic origin. Spring-wheat area. SEE ALSO *Alternaria, Helminthosporium, Stemphylium, Xanthomonas.*

BLACK POINT. Chiefly in the spring-wheat area. See the fungi listed under BLACK GLUMES.

BLAST, BLIGHT (floret sterility)—nonparasitic, chiefly drought or heat injury. Northern and southern Great Plains, occasionally in the Central States and Northwest. See also foot rots (*Cercosporella, Fusarium, Gibberella, Helminthosporium, Ophiobolus, Pythium*), and rusts (*Puccinia*).

CORKSCREW, TWIST (failure of heads to emerge from boot)—cause unknown. Calif., Mont., Oreg.

CRINKLE-JOINT (broken straw)—cause not determined, but various foot rots and sometimes *Septoria nodorum* implicated. Central and Western States from Minn. to Okla. and Mont.; occasionally in East (Ky., Pa.).

DRYLAND FOOT ROT—probably caused chiefly by *Helminthosporium sativum.* On winter wheat in semiarid regions throughout the Western States. May be associated with other types of foot rot and root rot (*Fusarium, Ophiobolus*), but not thought primarily due to these fungi.

LATE BLAST, WHITEHEADS—cause unknown. Kans., Nebr., Okla. Resembles dryland root rot but is not limited to arid regions and does not occur in patches.

ROSETTE, FALSE TAKE-ALL. See MOSAIC.

STRIPE, YELLOW STRIPE—cause unknown but typically occurs in seedlings and may be due to genetic chlorophyll defects (Ind., N.Y., Pa.), or to yellow strains of mosaic virus (Ill.).

YELLOW BERRY—caused by nitrogen deficiency during kernel formation. General.

II. Emmer Group

(1) *Triticum dicoccum* Schrank, emmer.
(2) *T. dicoccoides* Koern., wild emmer.

Wheat relatives: (1) of European origin, (2) native of Palestine. (1) is grown in the United States chiefly in the spring-wheat area and is used for stock food; some varieties have been a source of rust resistance in wheat breeding. (2) is also used in wheat breeding as a source of disease resistance.

Anguina tritici (Steinbuch) Filip., head nematode. Va. (1).

Cercosporella herpotrichoides Fron, eyespot foot rot. Oreg., Wash. (1).

Claviceps purpurea (Fr.) Tul., ergot. Wis. (1).

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Ohio (1).

Fusarium culmorum (W.G.Sm.) Sacc., root and culm rot. Oreg., Wash. (1).

F. equiseti (Cda.) Sacc., *F. oxysporum* Schlecht., and *F. scirpi* var. *acuminatum* (Ell & Ev.) Wr., root rot. N.Dak. (1).

Gibberella zeae (Schw.) Petch, scab. Ohio, S.Dak. (1).

Helminthosporium sativum Pam., King, & Bakke, root rot. N.Dak. (1).

Ophiobolus graminis Sacc., take-all. N.Y. (1).

Puccinia glumarum (Schm.) Eriks. & E.Henn. (II,III), stripe rust. Idaho, Oreg. (1).

P. graminis f. sp. *tritici* Eriks. & E.Henn. (II,III), stem rust. Calif., Mo., Okla., Tex., Wash. (1); Minn., Tex. (2). Emmer varieties are resistant to most, but not all, of the known physiologic races.

Puccinia rubigo-vera (DC.) Wint. f. sp. *tritici* (Eriks.) Carl. (II,III), leaf rust. Ga., Mo., Oreg., S.Dak., Tex. (1); Tex. (2). Both species are resistant to most, but not all, of the known physiologic races, as shown by tests in Ind. and Kans.
Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, secondary root rot. N.Dak. (1).
Pythium arrhenomanes Drechs., root browning. N.Dak. (1).
Septoria nodorum Berk., glume blotch. Md. (1).
S. tritici Rob. ex Desm., speckled leaf blotch. Oreg. (1).
Tilletia caries (DC.) Tul., rough-spored bunt. Minn., N.Dak., S.Dak., Wash. (1). Susceptibility to *T. foetida* (Wallr.) Liro has been demonstrated experimentally in Minn. and N.Dak. but no field collections reported.
Wojnowicia graminis (McAlp.) Sacc. & D. Sacc., secondary root rot. Oreg., Wash (1).

III. Einkorn

Triticum monococcum L.

European wheat-ally tested in cereal nurseries in the United States but not contributing as yet to improved wheat varieties.

Cercosporella herpotrichoides Fron, eyespot foot rot. Oreg., Wash.
Fusarium culmorum (W.G.Sm.) Sacc., root rot. Wash.
Puccinia graminis Pers. f. sp. *tritici* (Eriks.) E.Henn. (II,III), stem rust, Mo.
P. rubigo-vera (DC.) Wint. f. sp. *tritici* (Eriks.) Carl. (II,III), leaf rust. Mo. Generally resistant, as shown by tests in Ind. and Kans.
Wojnowicia graminis (McAlp.) Sacc. & D.Sacc., secondary root rot. Oreg., Wash.

IV. Polish Wheats

Triticum polonicum L.

Group of old European wheats, grown chiefly in cereal nurseries in the United States.

Cladosporium herbarum Pers. ex Lk., leaf mold. Oreg.
Puccinia glumarum (Schm.) Eriks. & E.Henn. (II,III), stripe rust. Wash.
P. graminis Pers. f. sp. *tritici* Eriks. & E.Henn. (II,III), stem rust. Iowa, Minn., Mo.
P. rubigo-vera (DC.) Wint. f. sp. *tritici* (Eriks.) Carl. (II,III), leaf rust. Kans.

V. Spelt

Triticum spelta L.

European wheat-ally, grown chiefly in cereal nurseries or occasionally cultivated in the United States.

Anguina tritici (Steinbuch) Filip., head nematode. Va.
Cercosporella herpotrichoides Fron, eyespot foot rot. Oreg., Wash.
Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose. Ill.
Fusarium culmorum (W.G.Sm.) Sacc., root rot. Oreg., Wash.
Gibberella zeae (Schw.) Petch, scab. Ill., Minn., Wis.
Helminthosporium sativum Pam., King, & Bakke, root rot. Oreg.
Ophiobolus graminis Sacc., take-all. N.Y.
Puccinia glumarum (Schm.) Eriks. & E.Henn. (II,III), stripe rust. Idaho.
P. graminis Pers. f. sp. *tritici* Eriks. & E.Henn. (II,III), stem rust. Kans., Minn., Mo., N.Dak., Oreg., S.Dak., Wash., Wyo.
P. rubigo-vera (DC.) Wint. f. sp. *tritici* (Eriks.) Carleton (II,III), leaf rust. Ill., Kans., Md., Minn., Mo., Okla., Oreg., Tex., Wis.
Pyrenochaeta terrestris (Hans.) Gorenz, J.C. Walker, & Larson, secondary root rot. N.Dak.
Rhizoctonia solani Kuehn, white foot rot. Oreg.
Septoria nodorum Berk., glume blotch. Md., Minn., Oreg.
S. tritici Rob. ex Desm., speckled leaf blotch. Ill., Oreg.
Tilletia caries (DC.) Tul., rough-spored bunt. N.Dak., S.Dak.
T. foetida (Wallr.) Liro, smooth-spored bunt. Minn.
Ustilago tritici (Pers.) Rostr., loose smut. Ill., N.Y. Oreg.
Wojnowicia graminis (McAlp.) Sacc. & D.Sacc., secondary root rot. Oreg., Wash.
Xanthomonas translucens (L.R.Jones, A.G.Johnson, & Reddy) Dows. f. sp. *undulosa* (E.F.Sm., L.R. Jones, & Reddy) Hagb., black chaff. Wis.

VI. Poulard Wheat

Triticum turgidum L.

Group of old European wheats, grown chiefly in cereal nurseries in the United States.

Puccinia graminis Pers. f. sp. *tritici* Eriks. & E.Henn. (II,III), stem rust. Minn., Mo., Pa.
P. rubigo-vera (DC.) Wint. f. sp. *tritici* (Eriks.) Carl. (II,III), leaf rust. Kans.
Septoria tritici Rob. ex Desm., speckled leaf blotch. Oreg.

Uniola

(1) *U. latifolia* Michx., broadleaf uniola.
(2) *U. laxa* (L.) B.S.P., spike uniola.
(3) *U. paniculata* L., sea-oats.

Tall perennials: (1) and (2) occurring in moist woodlands from New Jersey to Florida, Texas and Oklahoma, useful to wildlife; (3) in sand dunes on the southeastern Coastal Plain from Virginia to Florida and Texas, a good soil binder because of extensive creeping rhizomes.

Leptosphaeria culmicola (Fr.) Karst., on dead culms. Ga. (1).
Phoma alumarum Ell. & Tracy, on glumes. Miss. (1,3).
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Ga. (2).
Pythium arrhenomanes Drechs., root necrosis. ? Mo.
Ustilago uniolae Ell. & Ev., seed smut. Del. to Ala. and Tex. (3).

Vetiveria

V. zizanioides (L.) Nash, vetiver.

Robust perennial of warm regions throughout the world, used in hedges and mat-making, cultivated for aromatic oil; locally escaped in Louisiana.

Didymella andropogonis Ell. & Ev., on leaves. La., Miss.
Didymosphaeria andropogonis Ell. & Langl, on dead culms. La.

Zea

Z. mays L., maize, Indian corn.

Robust annual, probably indigenous to Mexico; cultivated since prehistoric times by the American aborigines from eastern and central United States southward to Peru. The center of field-corn culture, the "Corn Belt" as generally defined, includes the Central States from Ohio and Kentucky to Oklahoma and Nebraska, but corn is grown extensively from the Atlantic Coast to the Great Plains except in northern

New England, the northern part of the Lakes States, and southern Florida and Texas; and also sparsely in the Rocky Mountains and Pacific Coast States. Field corn includes the agronomic groups dent corn (*Z. indentata* Sturtev.) and flint corn (*Z. indurata* Sturtev.), and intermediate types. Sweet corn (*Z. saccharata* Sturtev.) is listed separately. It is grown as a home-garden crop in every State, including Alaska, Hawaii, and Puerto Rico; its principal commercial culture is in the area from Maine to Maryland, Kansas, and Minnesota, with local centers in California, Colorado, Louisiana, and Washington.

Acremoniella verrucosa Togn., ear mold. P.R.

Aerobacter spp., on necrotic or decaying stalks, roots, and leaves. Cosmopolitan.

A. aerogenes (Kruse) Beijer., *A. cloacae* (Jordan) Bergey et al., and *A. dissolvens* (Rosen) Waldee (=*Erwinia dissolvens* (Rosen) Burkh.) have been reported in this connection. The first 2 species are cosmopolitan saprophytes; the organisms identified in early literature as *Bacterium zeae* Burr., and *Bacillus zeae* Russell are perhaps synonyms of the saprophytic species or may refer to the stalk-rot pathogen.

Alternaria spp., commonly *A. Tenuis* Nees ex Cda., secondary leaf spot and root rot, ear and seed mold. Cosmopolitan.

Angiopsora zeae Mains (II,III), rust. P.R. O and I unknown.

Ascochyta maydis Stout, on leaves. Ill. *A. zeae* Stout—Ill. *A. zeicola* Ell. & Ev., on dead stalks. N.J.

Aspergillus spp., ear mold, kernel rot, scutellum rot, preemergence seedling blight. Of the several associated species *A. niger* v. Tiegh., black ear mold, is most frequent; its prevalence increases from the humid (eastern) to the dryer (western) parts of the Corn Belt. Other species reported include: *A. candidus* Lk.; *A. flavus* Lk. ex Fr., yellow ear mold, in Fla., Ill., Iowa, Tex.; *A. glaucus* Lk. ex Fr. (group) in Ill. and Md.; *A. ochraceus* Wilhelm; *A. tamarii* Kita; and *A. versicolor* (Vuill.) Tiraboschi in Ill.; *A. terreus* Thom in Mo.

Bacterium stewartii (*stewarti*) E.F.Sm., bacterial wilt. General, but most frequent in the East and rare in the West; infrequent on field corn except on certain strains. Has been referred to *Xanthomonas* because of yellow color but is not typical of this genus otherwise (nonmotile).

Basisporium gallarum Moell.: See *Nigrospora*.

Botrytis cinerea Pers. ex Fr., gray mold of ears. Va., Wash.

Cephalosporium acremonium Cda. (sometimes but not necessarily cited as Cda. ex Fres.), black-bundle disease. General, especially on dent corn. Probably at most a secondary factor in this disease, which is more closely correlated with particular strains of inbred corn under adverse environmental conditions; sometimes associated with ear and kernel decay.

Cercospora sorghi Ell. & Ev., leaf and sheath spot. Ala., Fla., La., Miss., N.C., S.C., Tenn., Tex., Va., W.Va.

C. zeae-maydis Tehon & Daniels gray leaf spot. Ill., Ky., Tenn., Va.

Chaetomium spp. (chiefly *C. globosum* Kze. ex Fr.), mold of stalks, ears, and seed. Ill., Ind., Iowa, Minn., Ohio. *C. melioloides* Cke. & Pk.—La., N.J., N.Y.

Cladosporium herbarum Pers. ex Lk., black mold of stalks, ears, and seed. Cosmopolitan. *C. tenuissimum* Cke. and *C. zeae* Pk. may be mere variants.

Clasterosporium longisporum Voorhees: See *Rhopographus zeae*.

Clasterosporium zeae Sacc. & Syd., on dead stalks. N.J.

Cochliobolus heterostrophus Drechs. (*Helminthosporium maydis* Nisik. & Miyake), leaf blotch, seedling blight. Pa. to Fla. and Tex.

Colletotrichum graminicola (Ces.) G.W.Wils., anthracnose; usually on leaves, sometimes on stalks. Chiefly in the East and South from Conn. to S.C., La., and Ill.

Coniothyrium zeae Stout, on leaves. Ill.

Corticium saskii (Shirai) T. Matsu. (*Rhizoctonia grisea* (Stevenson) Matz), root and stalk rot. P.R.

Cunninghamella sp., associated with ear rot. Va.

Dendrophoma zeae Tehon, on leaves. Ill.

Diaporthe phaseolorum (Cke. & Ell.) Sacc. (*D. incongrua* Ell. & Ev.), on dead stalks. Ky., La., N.J.

Diplodia frumenti Ell. & Ev.: See *Physalospora zeicola*.

Diplodia macrospora Earle, dry rot of ears and stalks. Md. to Fla., La., and Tenn. Leaf spot—Miss.

D. natalensis P. Evans, *D. tubericola* Ell. & Ev.: See *Physalospora rhodina*.

D. zeae (Schw.) Lév. (*D. maydis* (Berk.) Sacc.), stalk rot, dry ear rot, white rot. General, but most frequent east of the Mississippi and north of the Ohio Rivers and in the Middle Atlantic States; occasional in the Far West.

Epicoccum spp. (*E. nigrum* Lk. ex Wallr. and *E. purpurascens* Ehr.), ear mold, seed rot, secondary leaf spot. N.J., Mich., Oreg., Va., Wash.

Erwinia dissolvens (Rosen) Burkh., bacterial root and stalk rot. Ariz., Ark., Ill., Ind., Ky., La., Miss., Mo., Tenn., Tex. Has been referred to *E. carotovora* (L.R.Jones) Holland, but consensus holds it distinct. Referred to *Aerobacter* (q.v.) by some authorities. See also *Pseudomonas*.

Fusarium spp., root rot, ear and stalk rot, seed rot, seedling blight. Widely reported, often without specific distinction and as associated with these diseases rather than definitely their causes. The following list includes only the species that are most frequently encountered and considered pathologically significant.

F. avenaceum (Fr.) Sacc., seedling root rot. Wis.

F. culmorum (W.G.Sm.) Sacc., seedling root rot. Calif., N.J., Oreg., W.Va.

F. equiseti (Cda.) Sacc., secondary root rot. N.Dak.

F. graminearum Schwabe: See *Gibberella zeae*.

F. merismoides Cda., stalk rot. N.Y. Oreg.

F. moniliforme Sheldon: See *Gibberella fujikuroi*.

F. oxysporum Schlecht., secondary root rot. N.Dak.

F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. Conidial stage of *Gibberella acuminata* Wr.

Gibberella fujikuroi (Saw.) Wr. (*G. moniliformis* Wineland), pink ear rot, seed rot, seedling blight. General. The conidial stage, *Fusarium moniliforme* Sheldon, is nearly universal on damaged corn throughout the Eastern, Central, and Southern States, its prevalence increasing somewhat toward the West; its pathological significance is somewhat questionable as it may occur commonly on sound corn, internally as well as externally. It may contribute to ear and seed deterioration but ordinarily it is a secondary factor in seedling blight; however, pathogenic strains have been distinguished. Also var. *subglutinans* Edwards, seedling blight. N.J., Ohio.

G. zeae (Schw.) Petch (*G. saubinetti* of authors, *Fusarium graminearum* Schwabe), stalk rot, red ear rot, seed rot, seedling blight. Eastern, Central, and Southern States, more frequent toward the East; not reported from the Pacific coast or Northwest. Less frequent than the preceding and correlated more definitely with pathological conditions.

Gloeocercospora sorghi D.Bain & Edg., zonate leaf spot. La., Miss.

Helminthosporium carbonum Ullstrup, leaf spot, char-

red ear, seedling blight. Pa. and Va. to Tenn., Iowa, and Minn.

Helminthosporium maydis Nisik. & Miyake: SEE *Cochliobolus heterostrophus.*

H. rostratum Drechs., on leaves. Ga., Miss.

H. sativum Pam., King, & Bakke, seedling root rot, stalk rot. Iowa, S.Dak.

H. turcicum Pass., leaf blight, stripe, seedling blight, white blast. Northeastern, Middle Atlantic, and Gulf States, occasional in Central States to Kans. and Minn.; also reported in Maine, Oreg., and Calif. but rare north and west.

H. zeicola Stout, on stalks. Ill.

Heterodera marioni (Cornu) Goodey; root knot. SEE *Meloidogyne* sp.

Himantia stellifera J.R.Johnston, on roots and stalks. P.R.

Hoplolaimus coronatus Cobb, in roots. ?Md.

Hyphochytrium catenoides Karling, in trichomes and other leaf tissues. N.Y.

Leptosphaeria spp., on leaves or stalks; none shown pathogenic but association with *Septoria* spp. has been noted for some. Species reported are *L. arundinacea* Sow. ex Sacc. (*L. orthogramma* (Berk. & Curt.) Sacc.). on stalks. Ala., Kans., Va., W.Va.; *L. eustoma* (Fr.) Sacc.— Mich.; *L. maydis* Stout, on leaves, associated with *Septoria zeae.* Ill.; *L. variiseptata* Stout—Ill.

Leptothyrium zeae Stout, on leaves. Ill.

Macrophoma zeae Tehon & Daniels: SEE *Physalospora zeae.*

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot, stalk rot. Ark., Calif., Colo., Ga., Ill., Iowa, Kans., Mo., Nebr., Okla., Tex. Seedling root rot—S.C. Includes reports of *Sclerotium bataticola.*

Meloidogyne sp., root knot nematodes. Ala., S.C., Ohio, S.C.

Monascus purpureus Went, silage mold. Conn., Iowa, Kans.; probably cosmopolitan.

Mucor spp., on damaged seed, cosmopolitan. Scutellum rot—central and western Corn Belt.

Mycosphaerella zeicola Stout, on leaves. Ill.

Nigrospora spp., dry ear rot, cob rot. Eastern and Central States to Kans. and S.Dak., usually not in the South or Far West 2 species are usually distinguished: *N. oryzae* (Berk. & Br.) Petch, and *N. sphaerica* (Sacc.) Mason, the latter perhaps more frequent; both were formerly reported as *Basisporium gallarum* Moell. This form of dry rot occurs most commonly in the cooler parts of the Corn Belt and is associated with immaturity.

Oidium tenellum (Berk. & Curt.) Linder, on kernels, ? seed rot or saprophytic. N.C. to Miss. and Okla.

Penicillium spp., blue mold kernel rot ("blue-eye" disease), scutellum rot, seedling blight. Occasional, Middle Atlantic States to Minn., Colo., and Tex., chiefly the more humid and northern parts. *P. oxalicum* Currie & Thom especially has been noted as causing seedling injury in Ill., Iowa, Ky., and Wis. *P. chrysogenum* Thom, *P. palitans* Westling, and *P. rugulosum* Thom have been identified on moldy corn in Iowa.

Phaeocytosporella zeae Stout, on stalks, stalk rot. Ill.

Phoma zeicola Ell. & Ev., on leaves. Ala., La., Tex, W. Va.

Phyllachora maydis Maubl., tar spot. P.R.

Phyllosticta sp., leaf spot. Fla., Tex. *P. zeae* Stout, on leaves. Ill.

Phymatotrichum omnivorum (Shear) Dug., sometimes on but not penetrating roots, giving erroneous impression of corn as a suscept of this parasite. Okla., Tex.

Physalospora spp., on leaves or stalks. *P. abdita* (Berk. & Curt.) N.E.Stevens—Fla.; *P. rhodina* (Berk. & Curt.) Cke.—Fla.

P. zeae Stout, gray ear rot. Ill., Ind.

P. zeicola Ell. & Ev., dry rot of ears and stalks. Fla., La., Okla.

Physoderma maydis Miyabe (*P. zeae-maydis* Shaw), brown spot. General in the Southern States from Va. to Fla. and La.; Occasional in Middle Atlantic and Central States to Kans. and S.Dak.; also Oreg., Calif.

Phytophthora parasitica Dast., root and stalk rot. Ind. (in greenhouse).

Pleosphaerulina zeicola Stout, on leaves. Ill.

Poria cocos Wolf, on roots. Fla., N.C.

Pratylenchus pratensis (De Man) Filip., root nematode. Fla., Kans., S.C., Tex.

Pseudomonas alboprecipitans Rosen, bacterial leaf and stalk rot. Ala., Ga., Kans., Nebr., Tex., Va. SEE ALSO *Erwinia.*

P. lapsa Ark, bacterial stalk rot. Calif.

P. syringae v. Hall (*P. holci* Kendr.), bacterial leaf spot. Conn., Iowa, Kans., Mass., N.Dak. The 3 preceding bacterial diseases and also the one caused by *Erwinia dissolvens* are considered distinct by authorities who have studied them critically. Besides the foregoing reports, unidentified bacterial leaf spots have been reported in Fla., Idaho, Ind., Iowa, Kans., Nebr., Tenn., Tex., and Wis.; unidentified bacterial stalk rots in Iowa, Mich., Minn., N.C., N.Dak., N.J., N.Y., Ohio, Pa., S.C., Tenn., Tex., Wash., Wis., and P.R. In many cases bacterial stalk rot is a sequel to injury by the European corn borer, *Pyrausta nubilalis* Hbn.

Puccinia polysora Underw. (II,III), leaf rust. Ga., Mass., Tex., C.Z., P.R. O and I unknown.

P. sorghi Schw. (*P. maydis* Bereng.) (II,III)—General except the Pacific Northwest. O and I on *Oxalis* spp., especially *O. corniculata* L.

Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, secondary root rot, pink rot. Colo., Iowa, Minn., N.Dak., Wis.

Pythium spp., seed rot, preemergence seedling blight, root rot, stalk rot. Chiefly in the North Central States, occasional throughout the Corn Belt; the following species noted: *P. aphanidermatum* (Edson) Fitzp. (*P. butleri* Subr.)—Ind., Iowa, Ky., Mo., Tex., Va.; *P. arrhenomanes* Drechs.—Ill., Ind., Ky., Md., Mo., Ohio, ?Pa., Wis.; *P. debaryanum* Hesse—Conn., Fla., Iowa, Mo., N.Dak., Wis.; *P. graminicola* Subr. (?*P. arrhenomanes* Drechs.)—Iowa, Ky. Other species reported, all in Wis., include: *P. irregulare* Buis., *P. paroecandrum* Drechs., *P. rostratum* Butl., *P. ultimum* Trow, *P. vexans* dBy.

Rhinotrichum sp., on damaged seed. Southern States.

R. tenellum Berk. & Curt.: SEE *Oidium tenellum.*

Rhizoctonia grisea (Stevenson) Matz: SEE *Corticium sasakii.*

R. solani Kuehn (=*Pellicularia filamentosa* (Pat.) Rogers), seedling root rot, damping-off. Ariz., Ill., Iowa, Mass., Minn., Ohio, S.C., Wash.

R. zeae Voorhees, sclerotial ear rot. Fla.

Rhizopus spp., seed rot, scutellum rot, seeding blight. Cosmopolitan. *R. nodosus* Namysl. and *R. tritici* K. Saito are among the most prevalent agents of scutellum rot in the central Corn Belt; *R. stolonifer* (Ehr. ex Fr.) Lind (*R. nigricans* Ehr.) was found to be the most frequent cause of scutellum rot in Pa.; also reported in Ill. and Ind.

Rhopographus zeae Pat. (*Clasterosporium longisporum* Voorhees), on mature stalks. Fla., Ga., Wis.

Sclerospora graminicola (Sacc.) Schroet., downy mildew. Iowa, Wis.

Sclerotium bataticola Taub.: SEE *Macrophomina phaseoli.*

Sclerotium rolfsii Sacc. (=*Pellicularia rolfsii* (Curzi) E. West), basal sheath and stalk rot. Ala., Fla., Tex., Va.

Septoria zeae Stout, on leaves. Ill.; associated with

Leptosphaeria maydis. *S. zeicola* Stout—Ill.; associated with *Mycosphaerella zeae*. *S. zeina* Stout—Ill.

Sphacelotheca reiliana (Kuehn) Clint., head smut. Occasional in the Southwestern and Pacific Coast States, Nebr. to Calif. and Wash., rarely in the Middle West and East (Ind., Ohio, N.Y.).

Sphaeropsis sp., on stunted stalks. Calif.

Spicaria sp., secondary leaf spot. S.C. *S. elegans* (Cda.) Harz var. *sorghina* Sacc. (*Fusarium moniliforme* Sheldon?), stalk rot. Tex.

Trichoderma spp., especially *T. viride* Pers. ex Fr., seed rot, secondary root rot. Iowa, Md., Minn., Nebr., S.C. Cosmopolitan saprophytes on corn trash, pathogenicity tests wholly or predominantly negative.

Ustilaginoidea virens (Cke.) Tak., false smut. La., C.Z.

Ustilago maydis (DC.) Cda. (*U. zeae* (Beckm.) Ung.), smut. General throughout the U.S., also P.R., and T.H.

MOSAIC—virus(es). In part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M. Sm., especially the strain designated as southern celery-mosaic virus—Fla., Iowa; in part *M. sacchari* Holmes, Saccharum virus 1 K.M.Sm., in proximity to sugarcane plantings, in which the virus perennates—Ark., Ga., La., Miss., Tex.. P.R., T.H.

STRIPE—virus (*Fractilinea zeae* (Holmes) McK., Zea virus 1 K.M.Sm.). T.H. A suspected virosis named red stripe is reported in Tex.

STUNT—unidentified virus. Calif., Tex.

ALBINISM—recessive chlorophyll defects or sometimes inability to translocate or utilize endosperm materials; occasional in seedlings, especially of inbred lines.

ALUMINUM TOXICITY. See IRON ACCUMULATION, and POTASSIUM DEFICIENCY.

BLACK BUNDLE. See *Cephalosporium acremonium*.

CHLOROSIS—in part ablinism (see above), in part malnutrition resulting from various mineral deficiencies. Nitrogen deficiency, indicated by yellowing of the older leaves progressing along the midrib from the tip, is general on sandy and impoverished soils. Magnesium deficiency ("sand drown"), indicated by interveinal yellowish-green to white streaks, has been reported in Mass., N.C., N.Y., and Va. Manganese deficiency, indicated by apical chlorosis and associated with excess of lime, was observed in R.I. White bud, caused by zinc deficiency and characterized by apical chlorosis with yellow streaking of leaves, has been reported in Fla. and Tex.

CRAZY TOP—vegetative proliferation of floral organs: cause unknown, soil toxicity and downy mildew suggested. Ill., Ind., Iowa, Ky., Pa.

IRON ACCUMULATION—occurs in nodes of plants suffering from potassium deficiency (q.v.); revealed by chemical tests and often associated with root and stalk rot. May be accompanied by aluminum compounds.

PHOSPHORUS DEFICIENCY—delayed maturity, defective ears, and often purple discoloration of leaves and stalks. Occurs widely on acid soils.

POPPED KERNEL—bursting of pericarp of kernels within the husk; genetic abnormality occurring in some strains.

POTASSIUM DEFICIENCY—marginal leaf burning, dwarfing, defective ears, weak stalks, and lodging. Occurs widely on muck, sandy, and impoverished soils, also on fertile soils after heavy liming.

PURPLE SHEATH SPOT—discoloration resulting from deposition of pollen and growth on it of saprophytic organisms. General, but intensity greatly influenced by environmental conditions. See also PHOSPHORUS DEFICIENCY.

ROOT AND STALK ROT—various factors including biological and nutritional. Among the former see especially *Erwinia. Pseudomonas, Pythium, Rhizoctonia, Diplodia, Fusarium,* and *Gibberella;* among the latter see POTASSIUM DEFICIENCY and PHOSPHORUS DEFICIENCY.

"SILK CUT"—transverse cracking of kernels above embryo; genetic abnormality occuring in some strains.

WATER SPOT (pellucid spot)—translucent spots on leaf blades, cause unknown, perhaps a genetic abnormality. Conn., Md., W.Va.

WHITE BUD, See CHLOROSIS.

WITCHES'-BROOM—cause unknown, perhaps an early stage of downy mildew infection. Iowa.

Zea mays var. *everta* (Sturtev.) Bailey, popcorn.

Bacterium stewartii E.F.Sm., bacterial wilt. Ind., Kans., Mass., Tex.

Cercospora zeae-maydis Tehon & Daniels, gray leaf spot. Va.

Diplodia zeae (Schw.) Lév. ear and stalk rot. Iowa.

Fusarium spp., especially *F. moniliforme* Sheldon, ear and stalk rot, secondary root rot. Iowa.

Gibberella zeae (Schw.) Petch, ear rot, root rot. Iowa.

Pseudomonas alboprecipitans Rosen, bacterial leaf and stalk rot. Kans.

Puccinia sorghi Schw. (II, III), leaf rust. Iowa.

Pythium debaryanum Hesse and *P. graminicola* Subr., seedling blight. Iowa.

Sclerospora graminicola (Sacc.) Schroet., downy mildew. Iowa.

Sclerotium rolfsii Sacc., root and stalk rot. Fla.

Sphacelotheca reiliana (Kuehn) Clint., head smut. Wash.

Ustilago maydis (DC.) Cda., smut. Ill., Ind., Iowa, R.I., Vt.

POPPED KERNELS—cause unknown, physiologic or genetic, not necessarily due to high temperature. Ga., Wash.

Zea mays var. *saccharata* (Sturtev.) Bailey, sweet corn.

Bacterium stewartii E.F.Sm., bacterial wilt. General but more particularly in the Northeastern States and East Central States, occasional in the West Central States. A correlation between intensity of bacterial wilt and the sum of the mean monthly temperatures in degrees F. for Dec., Jan., and Feb. has been shown to hold in this region, the disease being mild or absent where this sum is below 90° and likely to be severe when it is above 100°F.

Cephalosporium acremonium Cda., black-bundle disease. Mont.

Cercospora zeae-maydis Tehon & Daniels, gray leaf spot. Va.

Diplodia zeae (Schw.) Lév., root and stalk rot, ear rot, seedling blight. Eastern and Central States, from Maine to Va. and west to Tex. and S. Dak.

Erwinia dissolvens (Rosen) Burkh., bacterial stalk rot. Fla., W. Va.

Fusarium spp., root, stalk, and ear rots. Middle Atlantic and Central States to Tex. and S. Dak.; also Calif. See under *Zea mays*.

F. moniliforme Sheldon, root and stalk rot. Ariz., Iowa, Md., N.Y., Ohio, Pa., W.Va. Cosmopolitan as a saprophyte, but parasitic strains are reported.

Gibberella zeae (Schw.) Petch, root rot, seedling blight. Eastern and Central States, chiefly east of the Mississippi River.

Helminthosporium turcicum Pass., leaf blight. Chiefly in the Middle Atlantic and Southern States, occasional in the Central States (Ill. to La., and Minn.)

Nigrospora oryzae (Berk. & Br.) Petch, dry ear rot. Iowa.

Physoderma maydis Miyabe, brown spot. Southern States.
Pseudomonas syringae v. Hall, bacterial spot. Mass.
Puccinia sorghi Schw. (II,III), leaf rust. General, especially in the Northeastern and North Central States.
Pythium spp., root rot. Ill., Iowa, Wis. *P. aphanidermatum* (Edson) Fitzp.—Tex.; *P. arrhenomanes* Drechs.—Ohio.
Ustilago maydis (DC.) Cda., smut. General, including P.R. and T.H.

MOSAIC—virus (*Marmor cucumeris* var. *commelinae* Holmes, southern celery mosaic virus). Fla.
STUNT—unidentified virus. Calif.

Zizania

Z. aquatica L., including the var. *angustifolia* Hitchc., wildrice.

Tall annual growing in fresh-water marshes and shallow lakes and streams from New England to the western Plains and south to Florida and Texas; the variety only in the North. One of the principal foods of aquatic birds; the grain also gathered by Indians for food and sale.

Claviceps sp. (? *C. purpurea* (Fr.) Tul.), ergot. Iowa, Maine, Md., Minn., Mo., N.Dak., Nebr., Wis. A physiologically distinct race from the ergot of cereals, regarded by some as a different species.
Diplodia oryzae Miyake, on dead culms. La.
Doassansia zizaniae J. J. Davis, stem smut. Wis. This has also been considered the sclerotium of an Ascomycete, but germination of the spores is reported.
Entyloma lineatum (Cke.) J. J. Davis, leaf smut. General.
Helminthosporium oryzae B. de Haan, leaf spot. Md., Minn.
Mycospherella zizaniae (Schw.) Lindau, on leaves. Del., Mich.
Ophiobolus oryzinus Sacc., culm rot. Va.
Sclerotium zizaniae J. J. Davis, on culms. Md., Wis.

Zizaniopsis

Z. miliacea (Michx.) Doell & Aschers, southern wildrice.

Tall perennial of marshes and shallow water from Maryland to Florida and Texas; important food plant of aquatic birds.

Didymella eumorpha (Berk. & Curt.) Sacc., on culms. La.
Helminthosporium sigmoideum Cav., leaf spot. Ark., La., Tex. Conidial stage of *Leptosphaeria salvinii* Catt.; the sclerotial state, *Sclerotium oryzae* Catt., also present.
Sclerotium hydrophilum Sacc. apud Rothers, on dead culms. La.

Zoysia

(1) *Z japonica* Steud., Japanese lawngrass.
(2) *Z. matrella* (L.) Merr., Manila grass.

Perennial grasses of eastern Asia, introduced for turf culture in the Eastern and Southern States and tropical America.

Claviceps yanagawensis Togashi, ergot. Reported in imported seed samples. (1).
LEAF SPOT—undetermined (*?Helminthosporium oryzae* B. de Haan). P.R.

GUTTIFERAE

Calophyllum

C. brasiliense Camb. var. *antillanum* (Britt.) Standl., maria.

West Indian tree, sometimes cultivated as ornamental. Woody plant, tropical America.

Irene calophylli F. F. Stevens, black mildew. P.R.
Lembosia sepotae Ryan, black spot. P.R.
Meliolidium portoricense Speg., on leaves. P.R.
Microthyrium calophylli Ryan, on leaves. P.R.
Perisporina portoricensis (F. L. Stevens) Seaver & Toro—P.R.

Clusia

Clusia spp.

Shrubs or small trees of tropical America, especially *C. rosea* Jacq., cupey, which is a source of medicinal resin and is often parasitic on other trees.

Amazonia (Meliola) clusiae F. L. Stevens, black mildew. P.R.
Asterina solanicola Berk. & Curt. (*A. coriacella* Speg.), black leaf patch. P.R.
Cephaleuros virescens Kunze, algal spot. P.R.
Clithris minor Tehon and *C. platyplacum* (Berk. & Curt.) Tehon (*C. clusiae* Tehon), on leaves, P.R.
Coccomyces clusiae (Lév.) Sacc., on leaves. P.R.
Guignardia clusiae F. L. Stevens, on leaves. P.R.
Mycosphaerella clusiae F. L. Stevens and *M. guttiferae* Miles, leaf spot. P.R.
Parodiopsis (Dimerium) melioloides (Wint.) Maubl., black mildew. P.R.
Pestalotia ?funerea Desm., on leaves. P.R.
Phyllosticta clusiae F. L. Stevens, leaf spot. P.R. (*P. clusiae* Allesch., described from Brazil, has priority.)
Uredo clusiae Arth. (II), rust. P.R.

Garcinia

G. mangostana L., mangosteen.

Malayan tree bearing edible fruit, occasionally cultivated in tropical America.

Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf spot. Md. (in greenhouse).
Pellicularia koleroga Cke. (*Corticium koleroga* (Cke.) Hoehn.), thread blight. P.R.

Mammea

M. americana L., mamey.

Tree of tropical America bearing edible fruit.

Aulographum melioloides Cke. & Mass., black mildew. P.R.
Cephaleuros virescens Kunze, green scurf. P.R.
Echidnodes mammeae Ryan, on leaves. P.R.
Meliola paulliniae F. L. Stevens, black mildew. P.R.

HAMAMELIDACEAE

Hamamelis, witch-hazel

Hamamelis spp., especially *H. virginiana* L. Shrubs or small trees (*H. macrophylla* Pursh sometimes large). Range 21,22,23,24,25,26,27, 28,29. Also *H. japonica* Sieb. & Zucc. and *H. mollis* Oliv., of Japan and China, cultivated as ornamentals in zone 5 and southward.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Md.
Cercospora hamamelidis Ell. & Ev., on leaves. Fla. (A nomen nudum).
Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., on wood. Cosmopolitan.
Dermatea hamamelidis (Pk.) Groves, on bark. Pa., W. Va.
Diplodia hamamelidis Fairm., on branches. N.Y.
Discosia artocreas Tode ex. Fr., leaf spot. Okla.
Fomes scutellatus (Schw.) Cke., wood rot. Widespread.
Gloeosporium hamamelidis Cke.: See *Phyllosticta hamamelidis*.
Gonatobotryum maculicola (Wint.) Sacc., leaf spot. N.H. to W.Va., Fla., and Wis.
Graphium hamamelidis Van Hook, leaf spot. N.Y. to Ind. and Tenn.
Haplographium apiculatum Pk., on leaves. Ind., N.Y.
Hendersonia foliorum Fckl. var. *hamamelidina* Fairm., on leaves. N.Y.
Hymenochaete agglutinans Ell., on trunk. Va.
Leptosphaeria hamamelidis Fairm., on branches. N.Y.
Monochaetia desmazierii Sacc., leaf spot. Va. to Ga. and Tenn.
Mycosphaerella sp., leaf spot. W.Va.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Mich., Wis.
Phyllosticta hamamelidis (Cke.) G. Martin, leaf spot. Conn. to Miss., Tenn., and Wis.
P. paviae Ell. & Ev.—Ill.
Physalospora obtusa (Schw.) Cke., on branches. Widespread.
Podosphaera biuncinata Cke. & Pk., powdery mildew. New England to Ill. and southward.
Polyporus semipileatus Pk., *P. gilvus* (Schw.) Fr., *P. pulchellus* Schw., wood rot.
Ramularia hamamelidis Pk., leaf spot. N.Y. to W. Va., Okla., and Wis.
Trametes variiformis Pk.—Panama.
Valsa ambiens Pers. ex Fr., on branches. Cosmopolitan.

Liquidambar

L. styraciflua L., sweetgum; redgum of lumber trade. Forest tree of range 20,22,25,27,28,29,30; also planted for ornament. *L. formosana* Hance and *L. orientalis* Mill., of Asiatic origin, are cultivated in the South (zone 6).

?Actinopelte dryina (Sacc.) Hoehn.—La.
Anthostoma amygdalinum (Cke.) Sacc., on bark. Ala., S.C.
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., also var. *chromogena* Shear, N. E. Stevens, & M. S. Wilcox, on branches, ?canker. Md. to Fla. and La.
Ceratostomella pluriannulata Hedgc., wood stain. Gulf States.
Cerocospora liquidambaris Cke. & Ell., leaf spot. Md. to Fla. and Tex. (A nomen nudum but widely used.)
C. tuberculans Ell. & Ev.—Fla., La., Miss., Mo.
Clitocybe tabescens Scop. ex. Fr., root rot. Fla.
Corticium stevensii Burt, thread blight. La. Rogers considers this a synonym of *Pellicularia koleroga* Cke.
Cryptosporella aurea (Fckl.) Sacc.—Ga.
Daedalea confragosa Bolt. ex Fr., wood rot. Cosmopolitan.
D. unicolor Bull. ex Fr., dead wood. Tex.
Diplodia natalensis P. Evans, wood stain. Gulf States.
Discosia artocreas Tode ex Fr., leaf spot. Okla.
Dothiorella berengeriana Sacc., bleeding necrosis. N.J., N.Y.
Didymella sp.—Ga.
Endoconidiophora coerulescens Münch and *E. moniliformis* (Hedgc.) Davidson, wood stain. Gulf States.
Endothia gyrosa (Schw.) Fckl., on dead branches and exposed roots. Md. to Gulf States.
Exosporium liquidambaris Tharp, leaf spot. Tex.
Fomes spp. (*F. applanatus* (Pers. ex Fr.) Gill., *F. fraxineus* (Bull. ex Fr.) Cke. and *F. geotropus* Cke., *F. marmoratus* (Berk. & Curt.) Cke.), wood rot of logs, timber, and sometimes living trees
Fusarium moniliforme Sheldon and *F. solani* (Mart.) Appel. & Wr., pink and purple wood stain. Southern States.
Ganoderma curtisii (Berk.) Murr. and *G. lucidum* (Leyss. ex Fr.) Karst., wood rot of fallen, or sometimes standing trees. Southern States.
Gloeosporium ?nervisequum (Fckl.) Sacc., on leaves. Miss., Tex.
Gnomoniella georgiana Miller & Thompson, on leaves. Ga.
G. amoena (Nees) Sacc. var. *petiolorum* (Schw.) Sacc. —Ga.
Graphium rigidum (Pers.) Sacc. and *G. rubrum* Rumbold, wood stain. Southern States.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Hydnum erinaceus Bull. ex Fr., *H. ochraceum* Pers. ex Fr., and *H. pulcherrimum* Berk. & Curt., wood rot, sometimes on living trees. Gulf States.
Hymenochaete agglutinans Ell., canker. Md.
Hypocrea lenta (Tode ex Fr.) Berk. & Br.—Ga.
Hypoxylon ellitum (Schw.) Curt.—Ga.
Lasiosphaeria pezizula (Berk. & Curt.) Sacc., wood stain. Ill.
Lentinus lepideus Fr., wood rot of timber. Cosmopolitan.
L. tigrinus Bull. ex Fr., heart rot starting in fire scars. La., Miss.
Lenzites spp. (*L. betulina* L. ex Fr., *L. saepiaria* Wulf. ex. Fr., *L. vialis* Pk.), wood rot of logs and timber. Cosmopolitan.
Leptothyriella liquidambaris Tehon & Stout, red leaf spot. Ill., Md., N.C.
Meloidogyne sp., root knot nematodes.
Mycosphaerella sp.—Ga.
Myriangium duriaei Mont. & Berk., on scale insects infesting bark. Widespread.
Nectria sp., canker. Ga.
Panus laevis Berk. & Curt., wound rot. Ark., La.
Penicillium spp., green mold of timber. Cosmolopitan.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Ohio to N.C. and Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora spp. (*P. fusca* N. E. Stevens, *P. obtusa* (Schw.) Cke., *P. rhodina* (Berk. & Curt.) Cke.), on branches. Southeastern States.
Pleurotus corticatus Fr., sapwood rot. La., Miss.
P. ostreatus Jacq. ex Fr.—La., Miss.
Polyporus spp.:
P. adustus Willd. ex. Fr. and *P. gilvus* (Schw.) Fr., white-mottled heart rot. Widespread.
P. fissilis Berk. & Curt. and *P. ludovicianus* (Pat.) Sacc. & Trott., heart rot in Lower Mississippi Valley.

Polyporus rigidus Lév., honeycomb rot of logs and stumps. Mississippi Valley.
P. sector Ehr. ex Fr., butt and root rot. Fla., Miss.
P. cinnabarinus Jacq. ex Fr., *P. dichrous* Fr., *P. galactinus* Berk., *P. hirsutus* Wulf. ex. Fr., *P. hydnoides* Sw. ex Fr., *P. pargamenus* Fr., *P. rhipidium* Berk., *P. sanguineus* Lloyd, *P. schweinitzii* Fr., *P. spraguei* Berk. & Curt., *P. subectypus* (Murr.) Lloyd, *P. supinus* Sw. ex Fr., *P. versicolor* L. ex Fr., and *P. zonalis* Berk., wood rots chiefly of logs, sometimes of standing trees.
Poria spp. (*P. ambigua* Bres., *P. canescens* Karst., *P. earleae* (Murr.) Sacc. & Trott., *P. ferruginosa* Schrad. ex Fr., *P. flaccida* Overh., *P. langloisiana* Murr., *P. nigrescens* Bres., *P. punctata* Fr., *P. versipora* Pers. ex Rom.), wood rot.
Schizophyllum commune Fr., sapwood rot. Cosmopolitan.
Septobasidium spp. (*S. alni* var. *squamosum* Couch, *S. apiculatum* Couch, *S. burtii* Lloyd, *S. mariani* Bres., *S. pseudopedicellatum* Burt, *S. sinuosum* Couch, and others), on scale insects infesting bark. Southern States.
S. rugulosum Couch—Fla.
Septoria liquidambaris Cke. & Ell., leaf spot. Mass. to Fla. and Tex.
Siridium liquidambaris Berk. & Curt., on branches, ?sapwood rot. S.C.
Sphaeropsis liquidambaris Dearn. & House (*?Physalospora obtusa*), on branches. N.Y.
Stereum spp. (*S. fasciatum* Schw., *S. gausapatum* Fr., and others), wood rot.
S. subpileatum Berk. & Curt., pocket rot of logs. Gulf States.
Torula ligniperda (Willk.) Sacc., red wood stain. Widespread.
Trametes rigida Berk. & Mont., pocket rot of timber. Southern States.
Valsa conspurgata (Schw.) Cke.—Ga.
V. liquidambaris (Schw.) Cke., on branches. N.J., S.C.
Xylaria persicaria (Schw. ex Fr.) Curt.—Ga.
DYING—cause unknown. Md.
LEADER DIEBECK—cause unknown. Ala., Ga. Fungi obtained from this diseased material included: *Diplodia* sp., *?Dothiorella* sp., *Graphium* sp., *?Nectria* sp. (*Volutella* type), and *Xylaria multiplex* Kze.

HIPPOCASTANACEAE

Aesculus, horsechestnut, buckeye

(1) *A. californica* (Spach) Nutt., California buckeye. Range 1,3,4,5.
(2) *A. carnea* Hayne (*A. hippocastanum* × *A. pavia*), red horsechestnut. Cultivated. Zone 3 and Pacific Northwest.
(3) *A. glabra* Willd., Ohio buckeye. Range 22, 24,25,27,29; including var. *arguta* Buckl., Texas buckeye, which occurs in range 30.
(4) *A. hippocastanum* L., horsechestnut. Cultivated. Planted in all States.
(5) *A. octandra* Marsh., yellow buckeye. Range 20,22,23,24,25,27,28,29.
(6) *A. pavia* L., red buckeye. Range 20,25,27, 28,29,30.
(7) Other species.

Trees, or sometimes shrubs, cultivated for shade and for conspicuous flowers and handsome foliage in some species.

Aecidium aesculi Ell. & Kell., rust. Ind., Kans., Nebr., Mo. (3).
Armillaria mellea Vahl. ex Fr., mushroom root rot. Cosmopolitan (7).
Botryosphaeria ribis var. *chromogena* Shear, N. E. Stevens, & M. S. Wilcox, twig blight. Md., N.Y., Ga. (7).
B. ribis (Tode ex Fr.) Gross. & Dug.—Ga. (5).
Cercospora aesculina Ell. & Kell., leaf spot. Fla. (6); W. Va. (5).
Collybia velutipes Curt., white sapwood rot. R.I. (4); collar rot, wound rot (7).
Cryptodiaporthe aesculi (Fckl.) Petr. (*Septomyxa aesculi* (Cda.) Petr.), on twigs. Calif. (1)
Cylindrocarpon album (Sacc.) Wr. (*Nectria coccinea* (Pers.) Fr.), on twigs. (Calif. (1).
C. ehrenbergi Wr. (conidial stage of *Neonectria caespitosa* (Fckl.) Wr.) on twigs. Calif. (1).
Diaporthe eres Nits. (*Phomopsis coneglanensis* (Sacc.) Trev.), on petioles and twigs. Cosmopolitan (7).
D. padi Otth var. *patria* Wehm. Ga. (7).
Diplodia aesculi Lév. (?imperfect stage of *Physalospora mutila* (Fr.) N. E. Stevens), on twigs. N.Y. (4).
?Eutypella fraxinicola (Cke. & Pk.) Sacc.—Ga. (7).
Fomes applanatus (Wallr.) Gill., heartwood rot. Cosmopolitan (7).
Fusarium scirpi var. *acuminatum* (Ell. & Ev.) Wr. (conidial stage of *Gibberella acuminatum* Wr.), dieback. Calif. (1).
Gloeosporium carpigenum Cke., on pericarps. Calif. ?Tex. (1).
Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf blight, anthracnose. Conn., Md., N.J., N.Y., Tex. (4); trunk and branch cankers—Mo. (4).
Gnomoniella sp.—Ga. (5).
Guignardia aesculi (Pk.) V. B. Stewart, leaf blotch. Ill., Iowa, Tex. (5); Ala., Miss. (6); General (3, 4,7). The imperfect stage is *Phyllosticta sphaeropsoidea* Ell. & Ev., with the following synonyms: *Phyllosticta aesculi* Ell. & G. Martin, *P. aesculicola* Sacc., *P. aesculina* Sacc., *P. paviae* Desm., *P. paviaecola* Brun.
Haplosporella aesculi Cke. & Mass. (*Sphaeropsis aesculi* Faut. & Roum.), on pericarps. N.Y. (4).
?Hypoxylon rubiginosum Pers. ex Fr.—Ga. (7).
Macrosporium baccatum Ell. & Ev., leaf spot. Kans. (3).
?Massariovalsa sudans (Berk. & Curt.) Sacc.—Ga. (5).
Monochaetia desmazierii Sacc., leaf spot. N.C. (7).
Mycosphaerella maculiformis Schroet. var. *hippocastani* Jaap (*Septoria hippocastani* Berk. & Br.), leaf spot. Calif. (1)
M. punctiformis (Pers.) Starb.—Ga. (6).
Nectria cinnabarina (Tode ex Fr.) Fr. (*Tubercularia vulgaris* Tode ex Fr.), twig blight and canker. Cosmopolitan (7).
N. hippocastani Allesch. (*Tubercularia carpigena* Cda.), on pericarps. N.Y. (4).
Phomopsis carposchiza Fairm., on nuts. N.Y. (4).
Phoradendron flavescens Nutt., mistletoe. Central and Southern States (3).
P. villosum Nutt., mistletoe. Calif., Oreg., Tex. (1).
Phyllactinia corylea Karst., powdery mildew. Calif., Tex. (1).
Phyllosticta paviae Desm. (=*Guignardia aesculi*), leaf spot. Fla., Tex., W. Va. (6).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4, 6, 7).
Physalospora obtusa (Schw.) Cke. (*Sphaeropsis malorum* Pk.), on twigs and branches. Ga. (6); N.J., N.Y. (7).
Phytophthora ?cactorum Leb. & Cohn, bleeding canker. R.I. (4).
Polyporus spumeus Sow. ex Fr., wood rot. N. Y. (7).

P. squamosus Huds. ex Fr., white-mottled heart rot. N.C. (5).
Septoria glabra Ell. & Ev. (=*hippocastani?*), leaf spot. Ind. (3).
S. hippocastani Berk. & Br., leaf spot. Pa., Vt. (4).
Taphrina aesculi (Patterson) Gies., yellow leaf blister. Calif., Tex. (1).
Trametes trogii Berk.—Calif. (1).
Uncinula flexuosa Pk., powdery mildew. Ind., Pa. (2); N.Y. to Kans. (3); Ala., Miss. (6); Widespread (4, 5, 6); Widespread in Central and Eastern States (7).
?Valsaria insitiva (Tode ex Fr.) Ces. & de N.—Ga. (5).
Verticillium ?albo-atrum Reinke & Berth., wilt.—Pa. (4).

LEAF SCORCH, NONPARASITIC.—Frequent in street trees during hot weather.

HIPPOCRATEACEAE

Hippocratea

H. obtusifolia Roxb.
Twining shrub of tropical America.

Agrobacterium tumefaciens (E.F.Sm & Town.) Conn, crown gall. Fla.
Asterina hippocrateae Ryan, black spot. P.R.
Asterinella hippeastri Ryan, black spot. P.R.
Botryorhiza hippocrateae Whet. & Olive (III), rust. P.R.
Microthyrium hippocrateae (Ryan) Toro, black spot. P.R.

HYDROPHYLLACEAE

Eriodictyon

Eriodictyon spp., yerba-santa.
Evergreen shrub. Range 1,4,9,10,11.

Coniothecium eriodictyonis Dearn. & Barth., sooty blotch. Calif.
Heterosporium californicum Ell. & Ev.
H. eucalypti Ell. & Ev. var. *maculicola* Ell. & Ev.
Torula glutinosa Cke. & Harkn., on leaves. Calif.

Hydrophyllum, waterleaf

(1) *H. canadense* L.
(2) *H. capitatum* Dougl.
(3) *H. occidentale* A.Gray
(4) *H. virginianum* L., Johns-cabbage.
(5) Other species.

Perennial or biennial woodland herbs in the Eastern and Central States (1,4) or in the West (2,3); sometimes grown in wild gardens.

Ascochyta hydrophylli Sprague & F.D. Bailey, leaf spot. Oreg. (5).
Ceratobasidium anceps (Bres. & Syd.) Jacks., stem and leaf necrosis. N.Y., Wis. (1,4). (Reported as *Sclerotium deciduum* J.J.Davis).
Erysiphe cichoracearum DC., powdery mildew. Occasional on all species named and others throughout their range.
E. polygoni DC. Idaho (2), Wash. (5).
Gloeosporium hydrophylli Dearn. & House, leaf spot. N.Y. (1,4).
Peronospora hydrophylli Waite, downy mildew. Wash. (2); Ill., Iowa, N.Y., Wis. (4); Md. (5).
Puccinia hydrophylli Pk. & G.W.Clint (III), rust. Colo., Utah (2); Calif. (3); N.Y. to Nebr. and N.Dak. (4); also on other species in this range.
P. rubigo-vera (DC.) Wint. var. *apocrypta* (Ell. & Tracy) Arth. (O,I), rust. Mont. to Colo., Utah, and Wash. (2); Calif. (3); N.Y. to Nebr. and N.Dak. (4); also on other species in this range. II and III on *Agropyron*, *Elymus*, and other grasses. A form with O and I on *Hydrophyllum*, II and III on *Elymus* has been designated f. sp. *hydrophylli* Mains.
Ramularia hydrophylli Ell. & Ev., leaf spot. Wash. (2).
Septocylindrium hydrophylli Daniels, leaf spot. Ill. (1).
Septoria hydrophylli Ell. & Dearn., leaf spot. N.Y. (1,4).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Ohio (1); N.Dak., S.Dak. (4). Also var. *fuliginea* (Schlecht.) Salm. in Minn., N.Dak. (4).

Nemophila

(1) *N. menziesii* Hook. & Arn., baby-blue-eyes.
(2) Other species.

Small annual herbs, mostly of California; sometimes grown in gardens.

Erysiphe cichoracearum DC., powdery mildew. Calif. (1,2); Tex. (1); Nev., Wash. (2).

Phacelia, scorpionweed

(1) *P. leucophylla* Torr.
(2) *P. whitlavia* A.Gray, California-bluebell.
(3) Other species.

Mostly annual (1) and several perennial herbs of the Far Western States; several of ornamental value; (1) and related forms often grown in gardens.

Cylindrosporium phaceliae Ell. & Ev., leaf spot. Mont., Tex. (3).
Erysiphe cichoracearum DC., powdery mildew. Calif., Mont., N.Mex., Tex. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Puccinia aristidae Tracy (O,I), rust. Ariz. (3). II and III on *Distichlis* and other grasses.
P. phaceliae Syd. & Holw. (III). Wash. (3).
P. rubigo-vera (DC.) Wint. var. *apocrypta* (Ell. & Tracy) Arth. (O,I). Mont. to Colo. and Oreg. (1); also to Calif. and N.Mex. (3). A form with II and III on *Bromus* spp. has been designated f. sp. *phaceliae* Mains.
Uredo contraria Arth. (II), rust. Calif. (3).

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (3).

Romanzoffia

R. sitchensis Bong.
Perennial herb of Pacific coast, grown in rock gardens.

Puccinia romanzoffiae Jacks. (III), rust. Oreg.

HYPERICACEAE

Ascyrum, St.-Peters-wort

(1) *A. hypericoides* L., St.-Andrews-cross.
(2) *A. stans* Michx., St.-Peters-wort.

Low woody perennials, commonly found in pine barrens near the Atlantic and Gulf coasts; grown in rock gardens and borders.

Cladosporium gloeosporioides Atk., leaf spot. Ala. (2).
Fusicladium ascyrinum Ell. & Ev., on floral bracts. La. (1).
Uromyces hyperici (Spreng.) Curt. (O,I,II,III), rust. Miss., N.J., Tex. (1).

Hypericum, St.-Johns-wort

(1) *H. frondosum* Michx.
(2) *H. kalmianum* L., Kalms St.-Johns-wort.
(3) *H. mutilum* L.
(4) *H. perforatum* L., common St.-Johns-wort, Klamath-weed; inimical to livestock.
(5) *H. prolificum* L., shrubby St.-Johns-wort.
(6) *H. virginicum* L., marsh St.-Johns-wort.
(7) Other species.

Mostly perennial herbs and shrubs, some evergreen and a few annual, native and introduced, widely distributed in the United States; many are grown for ornament in rock gardens and borders, several are wildlife-food plants, and a few are weeds (4) in cultivated ground and rangeland.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on stems. Pa. (5); ?S.C. (6).
Cercospora hyperici Tehon & Daniels, leaf spot. Ill. (7).
Cladosporium gloeosporioides Atk., leaf and stem spot. Ala., N.J., Wis. (3); N.Y., Wis. (6). Perhaps a *Cercospora.*
Didymella prominens Ell. & Ev., on stems. Ga. (7).
Erysiphe cichoracearum DC., powdery mildew.
Gibberidea heliopsidis (Schw.) Shear, black knot on stems. Md. (7).
Gloeosporium cladosporioides Ell. & Halst.: SEE *Cladosporium gloeosporioides.*
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Leptostroma hyperici Schw., on stems. Pa. (4).
Meloidogyne spp., root knot nematodes. Fla. (4); Md. (7).
Mesopsora hypericorum (Wint.) Diet. (?II), rust. Mont. (on *H. scouleri* Hook.).
Mycosphaerella sp. (*Sphaerella hypericina* Ell.), on leaves. N.J. (2,5); Ill. (7).
Rhabdospora sphaerelloides (Ell. & Kell.) Sacc. & Syd., on stems. Iowa (3); Kans., Ohio, Wis. (7).
Uromyces hyperici (Spreng.) Curt. (O,I,II,III), rust. N.C. (1); Ill., N.Y., Wis. (2); Maine to Ala. and Iowa (3); Maine, N.Y., Pa. (4); Pa. to Miss., Tex., and Wis. (5); Maine to Fla., Mo., and Wis. (6); also on other species in this range and in Calif.

IRIDACEAE

Babiana

Babiana sp.

Cormous herb of South Africa, grown for ornament.

MOSAIC—iris mosaic virus. Calif.

Belamcanda, blackberry-lily

B. chinensis (L.) DC.

Perennial herb of eastern Asia, grown for ornament and locally naturalized in the East and South.

Alternaria sp., leaf spot. Kans., Va.
Heterosporium iridis (Fautr. & Roum.) Jacques, (conidial stage of *Didymellina macrospora* Kleb.), leaf spot. Calif., Iowa, Kans., N.Y., Okla., Va., Vt.

Crocus

Crocus spp.

Hardy cormous herbs, mostly of southern Europe and southwestern Asia, grown as pot plants and naturalized in gardens. Our reports usually do not discriminate as to species, but the more commonly grown garden crocuses belong to *C. biflorus* Mill., *C. susianus* Ker, *C. moesiacus* Ker, and *C. verus* All., which are spring flowering, and *C. sativus* L., autumn flowering.

Fusarium oxysporum Schlecht., corm rot. N.Y., Pa.; also observed in imported stocks. Various strains implicated, the form *lilii* Ime identified in one instance, and *F. orthoceras* Appel & Wr. var. *gladioli* McCull. also shown pathogenic.
Penicillium sp. (*?P. gladioli* McCull. & Thom), blue mold rot. Observed on imported stocks.
Pseudomonas marginata (McCull.) Stapp, scab. Observed occasionally on imported stocks.
Stromatinia gladioli (Drayton) Whet. (*Sclerotina gladioli* Drayton), dry rot. Reported in N.J., N.Y., and ?Wash.; frequently observed on imported stocks and probably widespread .
MOSAIC—virus (*?Marmor iridis* Holmes, Iris virus 1 K.M.Sm.). Calif., Md.

Freesia

F. hybrida Hort. (cultigen derived from *F. refracta* Klatt. and other species.)

Cormous herbs of South Africa, extensively grown under glass for cut flowers and indoors as pot plants; commercial corm production chiefly in California and Texas.

Fusarium spp., root rot, wilt, corm rot. Calif., Fla., Tex.; also in commercial stocks from these sources and abroad. Various strains of *F. oxysporum* Schlecht. implicated; also *F. orthoceras* Appel & Wr. var. *gladioli* McCull., among others; *F. solani* (Mart.) Appel & Wr. in Tex.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Heterosporium iridis (Fautr. & Roum.) Jacques, leaf spot. Conn.
Meloidogyne sp., root knot nematodes. Calif.
Penicillium sp. (*?P. gladioli* McCull. & Thom), blue mold rot.
Pseudomonas marginata (McCull.) Stapp, scab. Wash.
Stromatinia gladioli (Drayton) Whet., dry rot. N.J., N.Y.

MOSAIC—virus (*?Marmor iridis* Holmes, Iris virus 1 K.M.Sm.). Calif. Also severely affected by bean yellow mosaic, or a strain of this virus. Also observed in commercial stocks from various sources.

RED BULB—cause unknown, probably in part *Fusarium* corm rot. Calif.; also in imported stocks.

"RUST"—cause unknown but not a true rust. Calif.

Gladiolus

G. hortulanus Bailey, complex cultigen derived from × *G. gandavensis* Van Houtte, *G. psittacinus* Hook., *G. primulinus* Baker, and others.

Cormous herbs of tropical and South Africa, long and extensively cultivated for ornament as garden flowers and for commercial cutting both in the open and under glass.

Alternaria spp., probably mostly *A. tenuis* Nees ex Cda., secondary leaf spot. Cosmopolitan. Other species perhaps *A. tenuissima* (Fr.) Wiltshire, also reported; none shown as parasitic.

Botrytis gladiolorum Timmermans (*?Sclerotina* (*Botryotinia*) *draytoni* Dennis & Wakef.), leaf and flower spot, corm rot. Calif., Fla., Mass., Md., Mich., N.J., N.Y., Oreg., Wash., Wis., Alaska; wet rot—Calif., Oreg., Wash., sometimes N.Y.

B. elliptica (Berk.) Cke., leaf blight of seedlings. Wash.

Cladosporium herbarum Lk. ex Fr., secondary leaf spot (or saprophytic). Cosmopolitan.

Curvularia lunata (Wakk.) Boed., brown spot of foliage and flowers. Fla., Md., Mich., Miss., N.C., N.Y., Va., Wis.

Dothiorella lanceolata (Cke. & Ell.) Petr. (*Sphaeropsis lanceolata*) on stems. S.C.

?Erwinia carotovora (Jones) Holland, soft rot. Mich.

Fusarium orthoceras Appel & Wr. var. *gladioli* McCull., corm rot, wilt, yellows; ?basal rot. N.Y. to Fla., Tex., and Minn.; Calif. A form of *F. oxysporum* but different from the following.

F. oxysporum Schlecht. f. *gladioli* (Massey) Snyd. & Hans., Fusarium rot (in storage), ?basal rot, dry rot or brown rot. General, except perhaps New England and the Pacific Northwest.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Heterosporium sp. (*?H. iridis* (Fautr. & Roum.) Jacques), leaf spot. Md.

Macrophoma gladioli (Cke.) Berl. & Vogl., on leaves. S.C.

Meloidogyne spp., root knot nematodes. N.C. to Fla. and Tex.; Calif.

Papulaspora spp., saprophytic on decaying corms but sometimes confused with smut, *Urocystis gladioli* W.G.Sm., not known in U.S. Several species identified: *P. appendicularis* H.H.Hotson, *P. coprophila* J.W.Hotson, and *P. dodgei* Conners, reported in N.Y.; *P. rubida* J.W.Hotson, in Pa.

Penicillium gladioli McCull. & Thom, corm rot (in storage): General in the North from Mass. to Colo. and Wash.; occasionally southward to Tex. and Calif. Other *Penicillium* spp. sometimes associated with this and other corm rots.

Phyllosticta gladioli Ell. & Ev., on leaves. Ala., S.C. Perhaps synonymous with *Macrophoma gladioli.*

Pseudomonas marginata (McCull.) Stapp, scab on corms, neck rot, leaf spot. General.

Rhizoctonia solani Kuehn, root rot. N.Dak., N.J., Tex. Leaf-base rot, collar (?neck) rot. Ill., Tex.

Sclerotium rolfsii Sacc., southern blight. Fla.

Septoria gladioli Pass., hard rot of corms, leaf spot. General.

Stemphylium sp., leaf and stem spot, "red spot." Fla., Mich., N.J., N.Y.

Stromatinia gladioli (Drayton) Whet. (*Sclerotinia gladioli* Drayton; *Sclerotium gladioli* Massey), dry rot of corms, leaf and stalk rot. General.

Tritirachium dependens Limber—Tex.

Xanthomonas gummisudans (McCull.) Starr & Burkh., bacterial blight. N.Y. to Mo. and N.Dak.; Wash.

MOSAIC—virus(es). In part caused by a strain of yellow bean mosaic virus, distinguished as mild mosaic; in part caused by a suspected but unproved virus, distinguished as "white break." The latter is probably the disease usually reported as mosaic and is reported from N.Y. to Ill., Calif., and Wash.; mild mosaic occurs widely in commercial stocks.

YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Md. (natural infection)

INK SPOT (on husks and corms)—cause unknown, perhaps owing to melanic fungi. Occasionally in commercial stocks.

"RUST"—nonparasitic spot necrosis of leaves, attributed to action of sunlight on water drops. Occasional in Eastern and Central States.

STORAGE BREAKDOWN (staining and pits in corms)—probably owing to lack of ventilation in storage.

Iris, fleur-de-lis

I. Bulbous Species

(1) *Iris xiphioides* Ehrh., English iris.
(2) *I. xiphium* L., Spanish iris.
(3) *I. xiphium* L. and *I. filifolia* Boiss., hybrids, Dutch iris.
(4) Other species.

Perennial herbs of Northern Hemisphere with large showy flowers. Horticultural types derived from these species.

Alternaria sp. (*?A. tenuis* Nees ex Cda.), leaf blight (?secondary) N.C., Oreg.

Aphelenchoides parietinus (Bast.) Steiner, root-plate and scale necrosis. Mich., N.C., N.Y., Tex., Wash.; also in imported stocks (3).

Botrytis sp. (*?B. cinerea* Pers. ex Fr.), gray-mold blight. Oreg.

Didymellina macrospora Kleb. (*D. iridis* Amer. auths.), leaf blight. Calif., N.C., Oreg., Wash. (2,3). This species has been definitely connected with the conidial stage *Heterosporium iridis*, whereas *D. iridis* (Desm.) Hoehn. is known only in the ascigerous stage. Much of the American material identified as *H. iridis* (*H. gracile*) or *D. iridis* belongs here but not necessarily all of it. It should be noted that Jørstad has transferred this species to *Mycosphaerella macrospora* (Kleb.) Jørst.

D. poecilospora McWhorter, secondary leaf spot. Oreg. (3). The name is a nomen nudum; the conidial stage is an unnamed *Heterosporium.*

Ditylenchus dipsaci (Kuehn) Filip. (=*D. iridis* Steiner), root-plate and scale necrosis. Fla., N.C., N.Y., Oreg., S.C., Va., Wash.; also sometimes in commercial bulbs from these sources and in imported stocks (1,2,3).

Fusarium sp. (various strains of *F. oxysporum* Schlecht.), basal rot, dry rot of bulbs and roots. Ariz., Calif., N.C., N.Y., Oreg., Tex., Va., Wash. (2,3).

Glomerella cingulata (Ston.) Spauld. & Schrenk, flower spot. Md. (2).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Heterosporium iridis (Fautr. & Roum.) Jacques (also reported as *H. gracile* (Wallr.) Sacc. but misnamed). SEE *Didymellina macrospora.*

Meloidogyne sp., root knot nematodes. N.C. (2).

Mystrosporium adustum Massee, leaf blight, ink disease (of bulbs). N.C., Oreg., Va. (2,3).
Penicillium spp., blue mold rot. General (1,2,3). *P. corymbiferum* Westling or *P. hirsutum* Dierckx have frequently been identified; *P. gladioli* McCull. & Thom and *P. digitatum* Sacc. also reported.
Puccinia iridis (DC.) Wallr. (II,III), rust. Ind. (1,2,3); Calif., La., N.C. (2,3). O and I on *Valeriana officinalis* in Asia, not known in America. O and I on *Urtica dioica* in Norway.
Rhizoctonia solani Kuehn, root rot. N.C., Wash. (3); neck rot, Wash. (3).
Sclerotium rolfsii Sacc., southern blight, white bulb rot. Calif., Fla., Md., N.C., Oreg., S.C., Tex. (1,2,3).
S. delphinii Welch—Conn. (2).
S. tuliparum Kleb., bulb rot. N.J. (2).
Mosaic—virus (*Marmor iridis* Holmes, Iris virus 1 K.M.Sm.). General (1,2,3).
Blindness in forced stocks—physiological, causes are complex but sometimes due to late digging, low temperature during curing, and too low a temperature during precooling periods; also, to small size of bulbs.

II. Rhizomatous Species

(1) *Iris germanica* L.: *I. pallida* Lam.; *I. variegata* L., and others, bearded iris.
(2) *I. kaempferi* Sieb. and *I. laevigata* Fisch., Japanese iris.
(3) *I. sibirica* L. var. *sanguinea* Ker-Gawl. (*I. orientalis* Thunb., not Mill.), Siberian iris.
(4) Other garden species

Horticultural types derived from these species.

Alternaria iridicola (Ell. & Ev.) J.A.Elliott, leaf spot. Ill., Wis. (1).
Ascochyta iridis Oud., leaf spot. Md., N.Y. (1).
Bacterium tardicrescens McCull., bacterial leaf spot. Mass. to Ala., Ind. and Minn. Natural infection reported only on (1), but (2) and (3) have been experimentally infected. Probably confused in some reports with *Erwinia carotovora.*
Botryotinia convoluta (Drayton) Whet., gray-mold rot, crown rot. Minn., N.J., N.Y., Wash. (1).
Botrytis cinerea Pers. ex Fr., blossom blight. Mass. (1).
Cladosporium herbarum Lk. ex Fr., secondary leaf spot. Reported in Mich., doubtless cosmopolitan (1).
Didymellina macrospora Kleb., leaf spot. General (1); Kans. (3); Calif., Ind., Nebr. (4).
Erwinia carotovora (Jones) Holland, bacterial soft rot of rhizomes, leaf blight. General (1), Ind. (2,4). See also *Bacterium tardicrescens.*
Fusarium sp., root rot. N.J., N.Y. (2).
Heterosporium iridis (Fautr. & Roum.) Jacques: See *Didymellina macrospora.*
?Kabatiella microsticta Bub., secondary leaf spot. Md., N.J., N.Y., Oreg., Va.
Leptosphaeria heterospora (de N.) Niessl, on rhizomes and roots, probably saprophytic. Md., Va. (1).
Puccinia iridis (DC.) Wallr. (II,III), rust. Calif. (1), Ind. (4). Evidence of complex specialization in this rust, not correlated with horticultural grouping of hosts, has been presented by Mains; most garden irises are resistant to races known in the U.S.
Rhizoctonia solani Kuehn, root rot, damping-off of seedlings. Occasional (1).
Sclerotium rolfsii Sacc., southern blight, white rot. N.Y. to Fla. and Tex. (1). The form known as *S. delphinii* Welch is reported on (2) in Conn., on (3) in Mass.
Scolecotrichum punctulatum Tracy & Earle (=*Asperisporium punctulatum* (Tracy & Earle) Maubl.), on leaves. Miss. (4).
Mosaic—virus (*?Marmor iridis* Holmes, Iris virus 1 K.M.Sm., but perhaps a different strain from the common virus of bulbous iris). Calif., N.J., N.Y. (1).

III. Native Species

(1) *Iris cristata* Ait., crested dwarf iris.
(2) *I. fulva* Ker-Gawl., red iris.
(3) *I. missouriensis* Nutt.
(4) *I. tenax* Dougl.
(5) *I. versicolor* L., larger blueflag.
(6) Other species.

Perennial herbs commonly in meadows or marshy ground: in the Southeast (1); the South Central States (2) and many others; the Northeast and North Central States (5); the West (3); and the Pacific Northwest (4). Some have ornamental value and are cultivated in gardens; also furnish food for wildlife.

Alternaria iridicola (Ell. & Ev.) J.A.Elliott, leaf spot. Mont., Wash. (3); Tex. (6).
Asteroma venulosum (Wallr.) Fckl., on leaves. Tex., Wis. (5).
Bacterium tardicrescens McCull., bacterial leaf spot. Conn., Wash. (1).
Colletotrichum liliacearum (Schw.) Ferr., on leaves. Ala., W.Va. (1).
Cylindrosporium iridis Ell. & Halst.—Ind., Iowa, N.Y., Tex. (5).
Didymellina macrospora Kleb., leaf spot. Calif., Ind., Kans., Md., Okla., Tex. (5); Tex. (6).
Didymosphaeria saccata Clem.—Colo., Idaho (3).
Mycosphaerella sp., on old leaves, ?leaf spot. N.Mex. (3). Reported as *M. iridis* (Auers.) Schroet., which is held to be a synonym of *Didymellina iridis* (Desm.) Hoehn.
Phoma iridina Sacc.—Mont. (3).
Phyllosticta iridis Ell. & G. Martin, leaf spot. Fla., Mich., N.Y., Ohio, Tex. (5); Wis. (5,6).
Puccinia iridis (DC.) Wallr. (II,III), rust. Ind., La., N.Y., Ohio (2); Ariz., Calif., Colo., Idaho, N.Mex., Wash. (3); Oreg. (4); Maine to Ind., La., and Iowa (5); also on other native species in this range; Tex. (6).
P. sessilis Schneid. (O,I), rust. Maine to Ind., Nebr., and Minn. (5). II and III on *Phalaris arundinacea.*
Sclerotium delphinii Welch, rhizome rot. Conn. (1).
Scolecotrichum punctulatum Tracy & Earle, (=*Asperisporium punctulatum* (Tracy & Earle) Maubl.), on leaves. Miss. (6).
Stictopatella iridis Tehon, leaf spot. Ill. (6).

Ixia

Ixia spp.

Cormous herbs of South Africa, grown for ornament indoors, or in the open in the South.

Fusarium orthoceras Appel & Wr. var. *gladioli* McCull., corm rot. Observed in commercial stocks.
Sclerotium sp. (*?S. tuliparum* Kleb.), corm rot. In commercial stocks.
Mosaic—virus (*?Marmor iridis* Holmes, Iris virus 1 K.M.Sm.). Calif.; also in commercial stocks.

Sisyrinchium, blue-eyed grass

(1) *S. angustifolium* Mill.
(2) *S. douglasii* Dietr.
(3) *S. graminoides* Bickn.

(4) Other species.

Grasslike perennials, widely distributed in the United States; several cultivated for ornament.

Aecidium residuum Arth. (O,I), rust. Okla., Tex. (3).
Kellermania sisyrinchii Ell. & Ev., ?leaf blight. N.Dak. (1); Calif., N.Mex. (4).
Pratylenchus pratensis (De Man) Filip., root nematode.
Uromyces houstoniatus [Schw.] Sheldon (II,III), rust. Maine (1), W.Va. (3). O and I on *Houstonia* spp.
U. probus Arth. (I,II,III), rust. Idaho, Oreg., Utah, Wash. (2); Tex. (4).

Sparaxis

S. tricolor Ker-Gawl., wandflower.

Cormous herb of South Africa, cultivated for ornament.

MOSAIC—virus (*?Marmor iridis* Holmes, Iris virus 1 K.M.Sm.). Calif., Oreg.

Streptanthera

S. cuprea Sweet

Cormous herb of South Africa, cultivated for ornament.

MOSAIC—virus (*?Marmor iridis* Holmes, Iris virus 1 K.M.Sm.). Calif.

Tigridia

T. pavonia Ker-Gawl., tigerflower.

Bulbous herb of Mexico and Central America, cultivated in many varieties for summer flowering.

Ditylenchus dipsaci (Kuehn) Filip., bulb nematode. In commercial stocks.
Fusarium orthoceras Appel & Wr. var. *gladioli* McCull., internal rot. Observed in commercial stocks.
Penicillium gladioli McCull. & Thom, storage rot. N.Y.; also in commercial stocks.
Pseudomonas marginata (McCull.) Stapp, scab. Md.
MOSAIC—virus (*?Marmor iridis* Holmes, Iris virus 1 K.M.Sm.). Oreg., Wash.; also in commercial stocks.

Tritonia

Tritonia spp. (*Montbretia* of florists).

Cormous herbs of South Africa, grown for ornament under glass and in the open.

Alternaria sp., leaf blight (?secondary). N.H.
Fusarium orthoceras Appel & Wr. var. *gladioli* McCull., corm rot, yellows. Calif.; also in commercial stocks.
Heterosporium sp. (*?H. iridis* (Fautr. & Roum.) Jacques (=*Didymellina macrospora* Kleb.), leaf blight. Oreg., Wash.
Sclerotium rolfsii Sacc., southern blight. Calif.
Stromatinia gladioli (Drayton) Whet., corm rot. In commercial stocks.
MOSAIC—virus (*?Marmor iridis* Holmes, Iris virus 1 K.M.Sm.). Calif., Oreg.

Watsonia

Watsonia spp.

Cormous herbs of South Africa, cultivated for summer flowering, chiefly in California.

Armillaria mellea Vahl ex Fr., root rot. Calif.
MOSAIC—virus (*?Marmor iridis* Holmes, Iris virus 1 K.M.Sm.). Calif.

JUGLANDACEAE

Carya, hickory: Syn. *Hicoria*

(1) *C. aquatica* (Michx. f.) Nutt., water hickory. Range 20,25,28,29,30.
(2) *C. cordiformis* (Wang.) K.Koch, bitternut hickory. Range 20,22,23,24,25,26,27,28,29,30.
(3) *C. glabra* (Mill.) Sweet, pignut hickory. Range 20,22,24,25,27,28,29,30.
(4) *C. illinoensis* (Wang.) K.Koch, pecan. Range 16,20,22,25,29; also cultivated in 30 and in the Southwestern and Pacific Coast States.
(5) *C. ovata* (Mill.) K.Koch, shagbark hickory. Range 21,22,23,24,25,26,27,28,29,30.
(6) *C. tomentosa* Nutt., mockernut hickory. Range 20,22,24,25,27,28,29,30.
(7) Other species.

Timber trees of eastern North America and eastern Asia with hard and very tough wood, and handsome foliage; very ornamental; some species grown for their edible nuts.

Actinopelte dryina (Sacc.) Hoehn.—Ill. (5).
Agrobacterium tumefaciens (E. F. Sm. & Towns.) Conn, crown gall. Kans., Md., Tex. (7); Widespread (4).
Aleurodiscus candidus (Schw.) Burt, bark patch. Mo., Ohio, Pa. (7).
A. oakesii (Berk. & Curt.) Cke.—Mo., Pa. (7).
Anthostoma juglandinum Rehm var. *caryae* Rehm, on twigs. Ill. (6).
Armillaria mellea Vahl ex Fr., root rot. Cosmopolitan fungus; specific reports from Calif. (4); Tex. (7).
Articularia quercina (Pk.) Hoehn., on leaves. Mo. (6); var. *minor* Charles—Tex. (4).
Aspergillus chevalieri Mangin, storage mold (nuts). Southern States. (4).
Botryosphaeria berengeriana de N., dieback. S.C. to La.; Ariz. (4).
B. ribis (Tode ex Fr.) Gross. & Dug., on branches. Fla. (7); occasional in Southern States (4).
Caryospora minor Pk., and *C. putaminum* (Schw.) de N., on nuts. Cosmopolitan.
Cephaleuros virescens Kunze, algal leaf spot. Fla. (4).
Ceratophorum uncinatum (G. W. Clint. & Pk.) Sacc., on leaves. Kans., Mo. (2); Fla. (6); Ark., Kans., Mo. (7).
Cercospora fusca Rand, brown leaf spot. Southeastern and Gulf States to N. Mex. (4).
C. halstedii Ell. & Ev., leaf blotch. Eastern and Southern States (7). (Conidial stage of *Mycosphaerella dendroides*).
Cercosporella caryigena (Ell. & Ev.) Hoehn.: SEE *Mycosphaerella caryigena*.
Cladosporium effusum (Wint.) Demaree, scab. Fla. (1); Kans., Wis. (2); general (4); Ill., Kans. (6); scab, leaf spot. General (7).
Clitocybe parasitica E. M. Wilcox, root rot. Okla. (6).
Coniosporium nucifoedum Fairm., on nuts. N.Y. (7).
Coniothyrium caryogenum Rand, on nuts. Southern States. (Formerly believed to cause kernel spot, q.v. under Black pit.) (4).
C. ?caryogenum Rand, on leaves. Ill. (6).

Cylindrosporium caryigenum Ell. & Ev.: See *Mycosphaerella caryigena.*

Cytospora caryigena Ell. & Ev., on branches. Va., W. Va. (7).

Daedalea ambigua Berk. and *D. elegans* Spreng. ex Fr., wood rot. Lower Mississippi Valley and Fla. (7).

D. quercina L. ex Fr. and *D. unicolor* Bull. ex Fr., wood rot. Eastern States (7).

Diaporthe apocrypta (Cke. & Ell.) Sacc., on branches. N.J., Ohio (7).

D. hicoriae Wehm., on branches. Mich. (3).

Didymella nucis-hicoriae Fairm., on nuts. N.Y. (7).

Discosia artocreas Tode ex Fr., on nuts. Cosmopolitan (7).

D. rugulosa Berk. & Cke.: See *Gnomonia caryae.*

Dothiorella hicoriae Dearn. & House, on twigs. N.Y. (6).

D. nucis Fairm., on nuts. N.Y. (7)

Elsinoë randii Jenkins & Bit., nursery blight. Va.; Southeastern and Gulf States (Ala., Fla., Ga., La., Miss., N.C., S.C., Tex.), Okla. (4).

Endothia parasitica (Murr.) P. J. & H. W. Anderson, on dead branches (5).

Eutypa heteracantha Sacc., on twigs. Okla. (4).

Favolus alveolaris (DC. ex Fr.) Quél., heart rot. N.Y. (6); Va., Vt. (7).

Fomes applanatus (Pers. ex Fr.) Gill., heart rot. Cosmopolitan (7).

F. connatus (Weinm. ex Fr.) Gill., white spongy heart rot. New England (7).

F. densus Lloyd, wood rot. La., Miss. (7).

F. igniarius (L. ex Fr.) Kickx., white spongy heart rot. Cosmopolitan (7).

F. marmoratus (Berk. & Curt.) Cke., wood rot. Lower Mississippi Valley (7).

F. pinicola (Sw. ex Fr.) Cke., brown crumbly heart rot. Wis. (7).

Fusarium carpineum J. J. Davis, leaf spot. Wis. (2).

F. roseum Lk., on nuts. N.Y. (7).

Fusicladium effusum Wint.: See *Cladosporium effusum.*

Ganoderma curtisii (Berk.) Murr., wood rot. Lower Mississippi Valley (7).

Gibberella saubinetii (Mont.) Sacc., on nuts. N.Y. (7).

Gloeosporium caryae Ell. & Dearn.: See *Gnomonia caryae* (7).

G. caryae var. *curvisporum* Dearn.: See *Gnomonia caryae* var. *pecanae* (7).

Glomerella cingulata (Ston.) Spauld. & Schrenk, on nuts. Occasional (4); Southern States (7).

Gnomonia caryae Wolf, anthracnose. Wis. (2); N.Y., Okla. (3); general (5); Conn. to Ill. (6); leaf spot. Widespread, N.Y. to Ga. and La. (7).

G. caryae Wolf var. *pecanae* Cole *(Leptothyrium caryae* var. *pecanae* Cole), liver spot. Ark., Ga., La., Miss., Tex. (4).

G. clavulata Ell., on fallen leaves. N.J. (7).

G. dispora Demaree & Cole, on leaves. Fla., Ga. (4, 7).

G. nerviseda Cole (*Leptothyrium nervisedum* Cole), vein spot. Ariz.?, Ark., La., Miss., Tex. (4).

G. setacea (Pers. ex Fr.) Ces. & de N., on leaves. Eastern and Southern States, Ga. (7). Var. *caryae* Dearn. & House, on leaves. N. Y. (3); Eastern and Southern States (7). Var. *macrospora* Ell. & Ev., on leaves. Eastern and Southern States (7).

Harpographium fasciculatum Sacc., on branches. La. (7).

Helicobasidium purpureum (Tul.) Pat. *(Rhizoctonia crocorum* Pers. ex DC.), root rot. Tex. (4).

Hendersonia davisii Ell. & Ev., leaf spot. Wis. (6).

H. pustulata Ell. & Ev., on nuts. N.J., N.Y. (7).

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

Hydnum septentrionale Fr. (and other *Hydnum* spp.), white spongy rot. Occasionally on living trees (7).

?Hypocrea lenta (Tode ex Fr.) Berk. & Br.—(7).

Hypoxylon rubiginosum Pers. ex Fr.—Ga. (7).

Karschia elaeospora Fairm., on nuts. N.Y. (7).

Leptosphaeria cacuminispora Fairm., on nuts. N.Y. (7).

Leptothyrium caryae (Ell. & Ev.) Cole: See *Gnomonia caryae.*

Marasmius nucicola McDougall, on nuts. Ill. (7).

Marssonina juglandis (Lib.) Magn., leaf spot. N.J. and N.C. to Iowa (7): Conidial stage of *Gnomonia leptostyla* Ces. & de N.

Massaria seriata Cke., on twigs? S.C. (7).

Massariovalsa sudans (Berk. & Curt.) Sacc. (*Melanconiopsis inquinans* Ell. & Ev.), on twigs. Ga., N.J. (3); on branches. Ga., N.J. (7).

Megalonectria (Sphaerostilbe) pseudotrichia (Schw.) Berk. & Br.—(7).

Melanconiella pallida Rehm, on branches. N.Y. to Ohio (7); perfect stage of *Melanconium pallidum.*

Melanconiopsis inquinans Ell. & Ev.: See *Massariovalsa sudans* (=*Melanconis sudans* (Berk. & Curt.) Wehm.)—(7).

Melanconis hicoriae Wehm., on branches. Ala. (6).

M. juglandis (Ell. & Ev.) Graves var. *caryae* Wehm., on bark. Ga. (3,6).

M. macrosperma Tul., on branches. Mich., Nebr., N.J. (7); perfect stage of *Melanconium magnum.*

M. pallida (Rehm) Wehm.—Mass., Mich. (2,5).

Melanconium pallidum Pk., on branches. Ohio, W. Va. (2).

Melanconium spp. (including *M. angustum* Ell. & Ev., *M. bicolor* Nees, *M. gracile* Ell. & Ev., *M. magnum* (Grev.) Berk., and *M. pallidum* Pk.), on branches, probably saprophytic in part. Widespread (7).

Melanomma caryophagum (Schw.) Sacc., on nuts. Widespread (7).

Meloidogyne spp., root knot nematodes (4).

Microcera coccophila Desm., stem canker. La., Tex. (4).

Microsphaera alni DC. ex Wint., powdery mildew. Occasional, Okla. (4); widespread (6); cosmopolitan, Tex. (7).

Microstroma juglandis (Bereng.) Sacc., leaf spot, witches'-broom. La. (1); Wis. (2); Ga. to Tex. (4); N.J. (5); widespread (3,5,7); general (6); Conn. (7). Var. *juglandis* Higgins, catkin blight. Ga. (4).

Monochaetia desmazierii Sacc., leaf spot. Md. (3), Tenn. (5,6), Md. to N.C. and Tenn. (7).

Mycosphaerella caryigena Demaree & Cole (*Cercosporella caryigena* (Ell. & Ev.) Hoehn., *Cylindrosporium caryigenum* Ell. & Ev.), downy spot. Ga. and Fla. to Texas and Ark. (4); leaf spot. Wis. (2).

M. convexula (Schw.) Rand—(Reported in Fla.)

M. dendroides (Cke.) Demaree & Cole *(Cercospora halstedii* Ell. & Ev.), leaf blotch. La. (1); Southern States, Fla. to Tex., also Ind. (4); Ga. (5); Southern States (6); Eastern and Southern States (7); on *Carya laciniosa* (Michx.) Loud.—Ga.

M. maculiformis (Pers. ex Fr.) Schroet., on fallen leaves. N.Y. (6).

Myriangium duriaei Mont. & Berk., on scale insects. Ga. (4).

M. tuberculans Miles, black spot on bark. Ga., Miss. (4). (=*M. curtisii* Mont. & Berk. according to Petch).

Myxosporium luteum Ell. & Ev., on bark. W.Va. (7).

Nectria cinnabarina Tode ex Fr., on twigs and bark. Cosmopolitan (7).

N. coccinea Pers. ex. Fr.—Ga. (7); var. *faginata* Lohman, Watson, & Ayers—New England States (7).

N. galligena Bres., trunk canker. Allegheny region (2, 6); Conn., W. Va. (3); Eastern States (7).

Nematospora coryli Pegl., on nuts. Southern States, Fla. (4).

Nummularia discincola (Schw.) Cke.—Ga. (6).

Pellicularia koleroga Cke. *(Corticium koleroga* (Cke.) Hoehn.), thread blight. Fla., N.C. (4).

Pestalotia nucicola Ell. & Ev., on nuts. N.J., N.Y. (7).

P. sphaerelloides Ell. & Langl., leaf spot. La. (1).
P. uvicola Speg., leaf spot. Fla., Tex. (4).
Pezizella oenotherae (Cke. & Ell.) Sacc., on twigs. Va. (7).
Phoma exocarpina Pk., on nuts. Mich., N.Y. (7).
Phomopsis sp., twig, branch, and trunk galls. Eastern States (7).
Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla. (6); Ind., Tex. (7); Gulf States, widespread (4).
Phragmodiaporthe caryae (Pk.) Wehm., ?branch canker. Iowa, N.Y. (7).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Mich. (2), Wis. (7).
Phyllosticta caryae Pk., leaf spot. La. (1); Fla., N.Y., Wis. (6); widespread (5,7); Tex. (7).
P. caryae Pk., on pecan: SEE *Elsinoë randii*.
P. convexula Bub., leaf spot. Va. (3), Okla. (4), Mo. (6), widespread (7).
P. subtilis Pk., leaf spot. Widespread (7).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (4); Tex. (7).
Physalospora fusca N. E. Stevens, *P. obtusa* (Schw.) Cke., on branches. Fla. (4); Southern States, Ga., (7).
P. rhodina (Berk. & Curt.) Cke., on branches. Fla. (4).
Pleonectria missouriensis (Ell. & Ev.) Sacc., on bark. Del. to Mo. (7)
Pleurotus corticatus Fr., sapwood rot. Ark. (7).
Polyporus spp. Besides certain cosmopolitan wood-rotting species including *P. adustus* Willd. ex. Fr., *P. hirsutus* Wulf. ex Fr., *P. pargamenus* Fr., and *P. versicolor* L. ex Fr., the following species have been reported from the Lower Mississippi Valley; *P. biformis* Klotzsch, *P. dichrous* Fr., *P. distortus* (Schw.) Fr., *P. hydnoides* (Sw.) Fr., *P. sector* Ehr. ex Fr., *P. supinus* Sw. ex Fr., *P. zonalis* Berk. (7); also *P. delectans* Pk.—N.Y. (7); *P. fissilis* Berk. & Curt.—Fla.
Poria ambigua Bres.—Southern States (7).
?P. canescens Karst.—(7).
?P. semitincta (Pk.) Cke.—(7).
P. spiculosa Campbell & Davidson, canker, heart rot. Pa. to N.C., and W. Va. (7).
P. unita (Pers.) Karst.—(7).
Pyrenochaeta nucinata Fairm., on nuts. N.Y. (7).
Ramularia albomaculata Pk., on leaves. Mich., N.Y. (7).
Rosellinia aquila (Fr.) de N., on bark. N.Y. (3).
R. caryae Bonar (*Dothichiza caryae* Bonar), twig canker. Mich. (5).
Schizophyllum commune Fr., heart rot (following drought injury). Okla. (4); wound rot. Cosmopolitan (7).
Septobasidium cokeri Couch, felt fungus canker. N.C. (1).
S. conidiophorum Couch—Tex. (7).
Septobasidium spp., especially *S. castaneum* Burt, *S. curtisii* (Berk. & Desm.) Boed. & Steinm., and *S. lilacinoalbum* Couch, felt fungus canker. Southeastern States (7).
Septoria caryae Ell. & Ev., leaf spot. Del. (7), Mich. (5), Tex. (4).
S. hicoriae Tharp, leaf spot. Tex. (2, 7).
Solenia ochracea Hoffm. ex Fr., bark patch. Mass. (7).
Sphaeropsis linearis Pk. (*S. caryae* Ell. & Ev.), on branches, Mo., N.Y., W.Va. (7).
S. pallidula Fairm. and *S. pericarpi* (Schw.) Ell. & Ev., on nuts. Widespread (7).
Stagonospora linearis Pk., on branches. Ill. (7).
Stereum hirsutum Willd. ex Fr. and *S. purpureum* Pers., wood rot. Ind., N.Y. (7).
Strumella coryneoidea Sacc. & Wint., trunk canker. Pa. (7).
Trametes malicola Berk. & Curt.—(7).
T. sepium Berk.—N.Y. (7).
T. mollis Sommerf. ex Fr.—N.Y. (7).
T. rigida Berk. & Mont., wood rot. Lower Mississippi Valley (7).
Trichothecium roseum Lk., pink mold on nuts following scab. Southern States (4); cosmopolitan (7).
Volutella caryogena Fairm., on nuts. N.Y. (7).
BLACK PIT AND KERNEL SPOT—caused by feeding punctures of plant bugs, *Nezara viridula* and *Leptoglossus phyllopus*. Southeastern and Gulf States (4).
BUNCH DISEASE—undetermined virus. La., Okla., Tex. (1); La., Miss., Okla., Tex. (4).
LEAF SCORCH, PHYSIOGENIC—low fertility and moisture-holding capacity of soil—(4).
LEAF AND STEM GALLS (*Phylloxera devastatrix* Perg.)—Ark., La., Miss. (4).
LITTLE LEAF—cause unknown. Occasional, N.C. to Miss. (4).
ROSETTE—zinc deficiency. Southeastern and Gulf States to N. Mex., Ariz., and Calif. (4); Southeastern States (7).
SAND BURN (seedlings)—caused by high temperature. Occasional in Southern States (4).

Juglans, walnut, butternut

(1) *J. californica* Wats., California walnut.
Large shrub of range 3,5,10; used as understock for cultivated walnuts.
(2) *J. cinerea* L., butternut.
Forest tree of range 18,19,21,22,23,24,25,26, 27,28.
(3) *J. hindsii* Jepson, Hinds walnut, northern California black walnut.
Tree of range 1,3,4; used as understock and for street planting.
(4) *J. nigra* L., black walnut.
Forest tree of range 18,19,20,21,22,23,24,25, 26,27,28,29,30.
(5) *J. regia* L., English (Persian) walnut.
Tree of southeastern Europe to China, hardy in zone 5, cultivated especially in California.
(6) *J. cordiformis* Maxim., Japanese walnut, (including var. *ailanthifolia* (Carr.) Rehd.). Cultivated in zone 4.
(7) Other species.

Actinothecium juglandis Dearn. & House. N.Y. (2).
Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. (5); occasional (7).
Alternaria sp., mold (of nuts). Calif. (5).
Armillaria mellea Vahl. ex Fr., root rot. Calif., N.C., N.J., Tex. (5); cosmopolitan (7).
Ascochyta juglandis Bolts., ring spot. Oreg., Wash. (5).
Botryodiplodia congesta (Lév.) Sacc.=*?Diplodia*, on bark of grafted plants. Oreg. (1).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches. Ga. (2,4), widespread (7).
Cacopaurus epacris Allen & Jensen, on roots. Calif. (3).
C. pestis Thorne, root necrosis associated with dieback. Calif. (5).
Cercospora juglandis Kell. & Swing., leaf spot. Mass. (2,7), Kans. (4,7).
Cladosporium sp., ?scab. Md., Minn. (4).
C. pericarpium Cke., on nuts. S.C. (4).
Cryptosphaeria juglandina Ell. & Holw., on dead branches. Iowa (7).
Cucurbitaria juglandina Ell. & Barth., on dead branches. Kans. (7). (Accompanied by *Camarosporium juglandis* Ell. & Barth.).
Cylindrocladium scoparium Morg., on dead branches. Ohio (7).
Cylindrosporium juglandis Wolf, leaf spot. Calif. (3); Ala., Okla., Tenn. (4); Ala., N.C. (5); leaf blight. Ala. and Tenn. to Tex., Calif. (7).

Cylindrosporium sp., leaf spot. Minn. (2).
Cytospora sp., canker. Ariz. (4); on branches. N.J. (5).
C. albiceps Ell. & Kell., on branches. Kans. (4,7).
C. juglandicola Ell. & Barth., on branches. Kans., Mich. (7).
Daedalea confragosa Bolt. ex Fr. and *D. quercina* L. ex Fr., wood rot. Cosmopolitan (7).
Diaporthe spiculosa (Alb. & Schw.) Nits. (*D. bicincta* (Cke. & Pk.) Sacc.), on branches. Iowa, Mich., N.Y. (7).
D. juglandis Ell. & Ev.: See *Melanconis juglandis.*
Dichomera juglandis Ell. & Ev., on dead branches. Ohio (7).
Diplodia juglandis Fr., on branches. La. (1); Calif. (5), widespread (7); ?dieback. Widespread (7).
Dothiorella gregaria Sacc., dieback, melaxuma. Calif. (5).
Erysiphe ?polygoni DC., powdery mildew. Calif. (?5).
Exosporina fawcetti E.E.Wilson, branch wilt, canker. Calif. (5). Probably conidial stage of *Hendersonula toruloidea* Nattrass; previously reported on apple, apricot, and peach in Egypt. May be a synonym of *Torula dimidiata* Penz. *H. toruloidea* produces pycnidia on *J. regia.*
Fomes conchatus (Pers. ex Fr.) Gill., wood rot. N.Y. (7).
F. everhartii (Ell. & Gall.) Schrenk, *F. igniarius* (L. ex Fr.) Kickx., white heart rot. Widespread, especially in the Southwest (7); *F. igniarius*—Okla. (4).
Fusarium lateritium Nees, on nuts. Conn., N.Y. (5); occasional (7); on nuts and twigs—Occasional (7).
F. semitectum Berk. & Rav. var. *majus* Wr., on nuts and twigs. Occasional (7).
Gnomonia leptostyla (Fr.) Ces. & de N. (*Marssonina juglandis*), anthracnose, leaf spot, leaf blotch. General (2,4,5,7).
Haplosporella druparum (Schw.) Starb.: See *Sphaeropsis druparum.*
H. juglandis Ell. & Barth.: See *Physalospora obtusa.*
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
?Hypoxylon rubiginosum Pers. ex Fr.—Ga. (7).
Macroplodia (Sphaeropsis) juglandicola Dearn. & House: See *Physalospora obtusa.*
Marssonina californica (Ell. & Ev.) Magn., leaf spot. Calif. (1).
M. juglandis (Lib.) Magn. Conidial stage of *Gnomonia leptostyla* (7).
Melanconis juglandis (Ell. & Ev.) Graves, canker, dieback. Ga., Iowa (2); Conn., N.J. (5); Conn., N.H., N.Y. (6); Conn., Md., N.Y., Pa. (7); widespread (2).
Melanconium oblongum Berk.: See *Melanconis juglandis.*
Meloidogyne spp., root knot nematodes. Reported on (2,4,5,6); Tex. (4).
Microsphaera alni DC. ex Wint., powdery mildew. Widespread (7).
Microstroma brachysporum (Sacc.) Vest., downy spot, white mold. General (2).
M. juglandis (Bereng.) Sacc. (*M. brachysporum* (Sacc.) Vest.), downy spot, white mold. Iowa (2); Calif., N.Mex. (3); Conn. to Miss., Calif., and Oreg. (5); widespread (4,7).
Nectria sp., canker. N.Y. (5).
Nectria spp., canker. Reported as *N. coccinea* Pers. ex Fr. in Conn., Va., and Oregon; *N. ditissima* Tul. (=*N. coccinea*) in N.Y. to Va., Tenn., and Wis.; *N. galligena* Bres. in Ind., N.C., Ohio, Pa., R.I., Va., and W.Va. (7).
N. cinnabarina Tode ex Fr., on branches. Widespread (7).
N. ditissima Tul. (probably *N. galligena*). Pa. to N.C. and Tenn., also R.I., Wis. (4).
N. galligena Bres., trunk canker. Allegheny region (2).
Phleospora multimaculans Heald & Wolf, leaf spot. Tex. (4,5,7).
Phomopsis juglandina (Fckl.) Hoehn., on twigs? Calif. (?5).
Phoradendron sp., mistletoe. Calif. (5).
P. flavescens (Pursh.) Nutt., mistletoe. Ind. (4); and var. *macrophyllum* Engelm., mistletoe. Ind. and southward, Ariz., and N.Mex. (7).
P. longispicum Trel.—Calif. (7).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Ind., Ohio (7).
Phyllosticta juglandina Sacc., on leaves. Oreg. (5).
P. juglandis (DC.) Sacc.—Ga., Ind., Oreg., Wash. (5).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4,5,7).
Physalospora obtusa (Schw.) Cke., on branches, twigs. Widespread (7).
Phytophthora cactorum (Leb. & Cohn) Schroet., collar rot. Calif. (1,3,5). *P. citrophthora* (R.E. & E.H. Sm.) Leonian causes similar lesions when artificially inoculated (1).
P. cinnamomi Rands, collar rot of seedlings. Md. to Ala. and La. (4); Md. (5).
Pleurotus applicatus Fr.—Ind. (7).
Polyporus spp., wood rot of dead trees and timber or injured parts of living trees. Species most frequently reported are *P. admirabilis* Pk.; *P. adustus* Willd. ex Fr.; *P. biformis* Klotzsch—N.Y.; *P. cinnabarinus* Jacq. ex Fr.; *P. delectans* Pk.—N.Y.; *P. gilvus* Schw.; *P. hirsutus* Wulf. ex Fr.; *P. spumeus* (Sow.) Fr.; *P. versicolor* L. ex Fr. (7).
P. sulphureus Bull. ex Fr., brown heart rot. Widespread (7).
Poria spp., including *P. ambigua* Bres., *P. pulchella* (Schw.) Cke., *P. punctata* Fr.—(7).
P. versipora (Pers.) Rom.—Mich. (7).
Pratylenchus musicola (Cobb) Filip., in roots. Calif. (4).
Rhabdospora juglandis (Schw.) Sacc., on branches. Pa. (4).
Schizophyllum commune Fr., wood rot. Cosmopolitan (7).
S. ?commune, on branches. Calif. (5).
Sclerotium rolfsii Sacc., seedling blight. Tex. (4).
Septobasidium curtisii (Berk. & Desm.) Boed. & Stein., felt fungus. N.C. (7).
Sphaeropsis druparum (Schw.) Cke., on nuts. Pa. (4).
S. juglandis Ell. & Barth.: See *Physalospora obtusa.*
Stereum fasciatum Schw., on dead branches. Okla. (4).
Xanthomonas juglandis (Pierce) Dows., bacterial blight. Calif. (3); Md., N.J., Pa. (4); N.Y. to Ga. and Tex., Pacific coast (5); Ga. (6).
BROOMING DISEASE—suspected virus. Md., N.Y., Va. (Wash., D.C.), Ga. (6).
BLACK END (of nuts)—physiogenic, probably drought injury. Calif., Oreg. (5).
BLACK-LINE (girdle)—?graft incompatibility. In Franquette variety of (5) grafted on (3) and hybrids of (3), Oreg., Calif.; incompatibility of scions of (5) grafted on roots of (4), Calif., Oreg., Wash
BROWN VELVETY PILE *(Eriophyes caulis).* Md. (5).
DIEBACK—boron deficiency. Oreg. (5). Also called "snake head."
ERINOSE (erineum)—leaf galls due to blister mites *(Eriophyes tristriatus).* Wash. (5).
FRECKLE SPOT (of leaves)—cause unknown. Oreg., Wash. (5).
LEAF SCORCH, SUNSCALD—physiogenic. N.J., Oreg., Wash. (5); in part boron deficiency.
LITTLE LEAF—zinc deficiency. Calif. (3).
ROSETTE—physiogenic, ?zinc deficiency. Del. (4); Calif., Del., Miss. (5); Del., Mo., S.C. (6).

SHRIVEL—nonparasitic, cause unknown. Oreg., Wash. (5).
WILT—unidentified fungus. Calif. (5).
WITCHES'-BROOM—cause unknown. Mich. (2,4,5,6).
YELLOWS, LITTLE LEAF—physiogenic, mineral deficiency. Calif., Md. (5).
YELLOWS—cause unknown. Del., Md., N.J. (4); Md. (6).

JUNCACEAE

Juncus, rush

(1) *J. balticus* Willd., wire rush, "wiregrass."
(2) *J. effusus* L., bog rush.
(3) *J. lescurii* Boland., salt rush.
(4) *J. tenuis* Willd., slender rush.
(5) Other species.

Numerous grasslike, mostly perennial, herbs occurring on plains, meadows, and on waste ground throughout the United States, predominantly in the north or at high altitudes. Several species are of significant forage value, some have long been used in basketry, and many are useful to wildlife and in erosion control.

Arthrinium bicorne Rostr. (*A. cuspidatum* (Cke. & Harkn.) Hoehn.), ?sooty mildew, on dead culms. Calif. (1).
Bifusella acuminata (Ell. & Ev.) Bonar & W.B.Cooke, on stems. Calif., Colo. (5).
Cercospora junci J.J.Davis, on leaves. Wis. (5).
Cintractia junci (Schw.) Trel., inflorescence smut. N.J. (2); Mass. to Va., Tex., and Wis. (4); Iowa, Miss., N.C., N.Y., Pa., Wis. (5).
Claviceps junci Adams, ergot. Wis. (5).
Didymella juncina (Berk. & Rav.) Sacc., on culms. S.C. (5)
Discella tenuispora Cke. & Harkn., on stems. ?Oreg. (1), Calif. (5).
Endodothella junci (Fr.) Th. & Syd., stem spot. Ga., Ohio (2); N.Y., Wis. (4); Iowa, Oreg. (5).
Hendersonia spp., on dead stems. Calif. (3). Reported as *H. culmicola* Sacc., *H. scirpicola* Cke. & Harkn., and others; probably saprophytic. SEE ALSO *Leptosphaeria.*
Heteropatella alpina (Ell. & Ev.) W. B. Cooke, on stems. Calif. (5).
Leptosphaeria spp., on dead stems. Calif. (1); Ga., Miss. (5). Reported as *L. albopunctata* (West.) Sacc., *L. caricinella* Karst., *L. juncina* (Auers.) Sacc., *L. michotii* (West.) Sacc.; probably all saprophytic.
Leptothyrium juncinum Cke. & Harkn., on stems. Utah (1), Calif. (3).
Metasphaeria defodiens (Ell.) Sacc., on dead stems. N.J. (2), N.Y. (5).
Ophiobolus junci J. H. Miller & Burton, on stems. Ga. (2).
Phoma junci Preuss, on stems. N.C., Va. (5).
Phyllachora junci Fckl., on culms. Iowa (5).
Pleospora juncicola Ell. & Ev., on culms. Colo. (1).
Ramularia junci Pk., leaf spot. N.Y. (5). *?Cercospora junci* J. J. Davis.
Rhabdospora sp., stem spot. Mont. (1).
Tolyposporium junci (Schroet.) Wor., inflorescence smut. Oreg. (5).
Trullula junci Cke. & Harkn., on stems. Calif. (3).
Urocystis junci Lagh., stem smut. Nev., Wyo. (1).
Uromyces junci (Desm.) L. Tul. (II, III), rust. N. Dak. to Kans., Calif., and Wash.; Pa. (1); Calif., Oreg. (3); Calif., Idaho, Nev. (5). O and I on various Compositae.
U. junci-effusi Syd. (II,III)—Mass. to Ala. and Mo. (2); Mont. to Calif. and Wash. (5). O and I unknown.
U. silphii [Burr.] Arth. (II,III)—Maine to N.C., Tex., and N.Dak., Wash. (4); also on other species in this range and to Fla. and Calif.

Luzula, woodrush

(1) *L. campestris* (L.) DC., common woodrush.
(2) *L. parviflora* Ehrh., millet woodrush.
(3) Other species.

Grasslike perennials occurring in woodlands and plains, mostly in the north or at high altitudes; several are of significant forage value, are useful to wildlife, or may be grown for ground cover in wild gardens (1,2).

Cintractia luzulae (Sacc.) Clint., inflorescence smut. Ind. (1).
Puccinia obscura Schroet. (II,III), rust. Maine to Kans. and Wis. (1); Idaho (1,2); Oreg., Wash. (2,3); Calif., Iowa, N.Y., Wis. (3). O and I on *Bellis perennis* in Europe.

LABIATAE

Agastache, giant-hyssop

(1) *A. foeniculum* (Pursh) O.Kuntze, on prairies, Minn. to Nebr. and westward.
(2) *A. nepetoides* (L.) O.Kuntze, New England to Minn. and southward.
(3) *A. scrophulariaefolia* (Willd.) O.Kuntze, New England to Minn. and southward.
(4) *A. urticifolia* (Benth.) O.Kuntze, Far West.

American perennial herbs, useful to wildlife and sometimes locally important as honey plants.

Ascochyta lophanthi J.J.Davis, leaf and stem spot. Wis. (1,3).
Heteropatella alpina (Ell. & Ev.) W.B.Cooke, on stems. Oreg. (4).
Peronospora lophanthi Farl., downy mildew. Ill., Iowa (2); Iowa, Wis. (3).
Phoma lophanthi Bub., on stems. Ohio (2).
Puccinia hyssopi Schw. (III), rust. N.Y. to Mo. and Iowa (2); Pa. to Ill. and Wis. (3).
Ramularia lophanthi Ell. & Ev., leaf spot. Calif. (3), Mont. (4).
Septoria lophanthi Wint., leaf spot. Ill., Mo., Ohio (2); Wis. (3).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Wash. (4). Var. *fuliginea* (Schlecht.) Salm.—Mo., Wis. (1); Utah, Wash. (4).
MOSAIC—unidentified virus. Ind. (3).

Ajuga, bugleweed

A. reptans L., creeping bugleweed.

Perennial herb of Europe, grown in rock gardens, and locally escaped.

Sclerotium rolfsii Sacc. (*S. delphinii* Welch), southern blight. Calif., Conn., Kans., N.J.

Blephilia

(1) *B. ciliata* (L.) Raf.
(2) *B. hirsuta* (Pursh) Benth.

Perennial herbs of the Eastern and Central States.

Cercoseptoria blephiliae H.C.Greene, leaf spot. Wis. (1).
Puccinia menthae Pers. (O,I,II,III), rust. Ind., Md., Mich. (1); Ill., Ind., Iowa, Mo., Tenn., Wis. (2).
Septoria menthicola Sacc. & Letendre, leaf spot. Wis. (1).

Clinopodium, fieldbasil, wildbasil, basilweed

(1) *C. vulgare* L.
(2) Other species.

Perennial herb of woodlands ranging from Maine to North Carolina and west to the Rocky Mountains. Some species (2) are cultivated for ornament or as sweet herbs and locally naturalized in the East.

Phyllosticta decidua Ell. & Kell., leaf spot. N.Y.
Puccinia menthae Pers. (O,I,II,III), rust. Mass. to Va., Colo., and Wis.

Coleus

(1) *C. blumei* Benth.
(2) Other species.

Perennial herb of Java (1), cultivated in many forms for ornamental and showy foliage. Other species (2) of tropical Africa and Asia are similarly used.

Alternaria sp., leaf spot. N.J. (1).
Aphelenchoides fragariae (Ritz.-Bos) Christie, leaf nematode. N.J.
Badhamia panicea (Fr.) Rostr., slime mold. Kans. (1).
Botrytis cinerea Pers. ex Fr., leaf spot, stem rot. Alaska.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Ala., Calif., Conn., Md., N.J., N.Y., Okla., T.H. (1, 2).
Orobanche ramosa L., parasitic on roots. N.Y.
Phyllosticta sp., leaf spot. N.J.
Pythium spp., damping-off, cutting rot. Calif., Md. *P. debaryanum* Hesse, *P. splendens* H. Braun, and *P. vexans* d By. have been reported.
Rhizoctonia solani Kuehn, damping-off. Fla., Ill., N.Y., Tex. (1,2).
Verticillium sp., wilt. Conn. (1).

Mosaic—unidentified virus. Ill. (1, 2).

Crinkle—noninfectious leaf deformity attributed to genetic factors. Md.

Collinsonia, horsebalm, horseweed, stoneroot

C. canadensis L., citronella, richweed, stoneroot.

Perennial herb of woodlands in the Eastern and South Central States, grown in wild gardens and used in pharmacy.

Dendryphiella interseminata (Berk. & Rav.) Bub. & Ranoj., on stems. N.Y.
Leptosphaeria collinsoniae Dearn. & House, on stems. N.Y.
?Phyllachora sp., black stem spot. Pa.
Spondylocladium tenellum Pk., on stems. N.Y.

Cunila, dittany, stonemint

C. origanoides (L.) Britt., common dittany.

Low perennial of dry hills, New York to Florida and westward; sometimes grown in rock gardens.

Puccinia menthae Pers. (O,I,II,III), rust. N.Y. to Va., Ark., and Ill.
Septoria cunilae Tehon, leaf spot. Ill.

Dracocephalum, dragonhead

(1) *D. parviflorum* Nutt., American dragonhead.
(2) Other species.

Annual or biennial, native herb (1), or mostly perennial herbs of Europe and Asia (2), grown for ornament.

Peronospora sp., downy mildew. Reported as *P. hedeomae* Kell. & Swing. in Wis.; *P. lophanthae* Farl. var. *moldavicae* Dearn. & Barth. in Wyo. (1).
Phyllosticta dracocephali Dearn. & Bisby, leaf spot. Tex. (1).
Sclerotium rolfsii Sacc., southern blight. Tex. (1), Ill. (2).
Septoria dracocephali Thuem., leaf spot. Tex., Wis. (1).

Galeopsis, hempnettle

G. tetrahit L.

Coarse annual of Europe, naturalized in the Northern States; a weed in cultivated ground.

Erysiphe cichoracearum DC. (*E. galeopsidis* DC.), powdery mildew. General.
Phyllosticta decidua Ell. & Kell., leaf spot. Wis.
Septoria galeopsidis West., leaf spot. N.Y., Vt.

Hedeoma, mock-pennyroyal

(1) *H. pulegioides* (L.) Pers., American pennyroyal, puddinggrass.
(2) Other species.

Weedy annual of the Eastern and Central States and southward; used in pharmacy, also useful to wildlife.

Peronospora hedeomatis (*hedeomae*) Kell. & Swing., downy mildew. Kans., Wis. (2).
Puccinia menthae Pers. (O,I,II,III), rust. Ill., Maine, Pa., R.I., Wis. (1): Ariz., Mont., N.Mex., Tex. (2).
Rhabdospora hedeomina (Pk.) Sacc., on stems. N.J., N.Y. (1); Tex. (2).
Septoria hedeomatis (hedeomae) Dearn. & House, leaf spot. N.Y. (1)

Hyssopus, hyssop

H. officinalis L.

European perennial, grown for ornament and as a sweet herb; sometimes escaped.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Mich.

Lamium, deadnettle

L. amplexicaule L., henbit.

Annual or biennial herb of Europe, widely naturalized in the United States; a weed in cultivated ground but useful to wildlife.

Erysiphe cichoracearum DC., powdery mildew. Calif., Kans., Okla., S.C.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla.
Peronospora lamii A.Braun, downy mildew. Miss., N.C., N.Y., Tex.
Rhizoctonia solani Kuehn, root rot. Tex.
Septoria lamii Pass., leaf spot. Okla.
Yellows—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.) Calif.

Lavandula

L. officinalis L., lavender.

Perennial herb or shrub of Mediterranean region, cultivated as a sweet herb and for ornament.

Armillaria mellea Vahl ex Fr., root rot. Tex.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.
Septoria lavandulae Desm., leaf spot. Ohio, Okla.

Leonotis, lions-ear, lions-tail

L. nepetaefolia (L.) R. Br.

Annual herb of South Africa, naturalized in the Gulf States and tropical America; sometimes grown for ornament.

Cercospora leonotidis Cke., leaf spot. La.
Phoma leonotidis Seaver, on stems. V.I.
Puccinia leonotidis (P.Henn.) Arth. (O,I,II,III), rust. Fla., P.R., V.I.

Leonurus, motherwort

L. cardiaca L., common motherwort.

Perennial herb of Europe, widely naturalized in the United States; a minor honey plant and sometimes grown in wild gardens.

Ascochyta leonuri Ell. & Dearn., leaf spot. La.
Dinemasporium hispidulum (Schrad. ex Fr.) Curt., leaf spot. Tex.
Phyllosticta decidua Ell. & Kell., leaf spot. Ohio, Tex., Wis.
Septoria lamii Pass., leaf spot. Pa.
Mosaic—unidentified virus. Ind.

Lycopus, water-horehound, bugleweed

(1) *L. americanus* Muhl.
(2) Other species.

Perennial herbs of moist ground widely distributed in the United States; wildlife-food plants.

Ascochyta lophanthi J.J.Davis, leaf spot. Wis. (1,2), Mass. (2).
Cercospora lycopi Ell. & Ev., leaf spot. La. (2).
Phyllosticta decidua Ell. & Kell., leaf spot. Okla. (1), Iowa (1,2), Wis. (2).
Puccinia angustata Pk. (O,I), rust. Maine to Md., Kans., and N.Dak. (1); also on other species in this range and south to Ala. II and III on *Eriophorum* and *Scirpus* spp.
Septoria lycopi Pass., leaf spot. Wis. (1,2).
Synchytrium cellulare J.J.Davis, leaf gall. Wis. (1,2).

Marrubium, horehound

M. vulgare L., common horehound.

European perennial, widely naturalized in the United States; grown as a sweet herb and used in pharmacy; a minor honey plant in California and Texas.

Cercospora marrubii Thorp, leaf spot. Okla., Tex.
Coniothyrium marrubii Fairm., on stems. Calif.
Diplodia herbarum (Cda.) Lév., on stems. Tex.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Ala.
Phoma lanuginis Fairm., on stems. N.Y., Tex.
Pleospora labiatarum (Cke. & Harkn.) Sacc., on stems. Calif.
Synchytrium marrubii Tobler, leaf gall. Tex.

Melissa, balm

M. officinalis L., common balm, lemon balm.

European perennial, cultivated as a sweet herb and for ornament; locally naturalized; also a minor honey plant.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska.
Phyllosticta decidua Ell. & Kell., leaf spot. N.Y.

Mentha, mint

(1) *M. arvensis* L., field mint. (including var. *canadensis* (L.) Briq. and var. *piperascens* Malinvaud, Japanese field mint).
(2) *M. piperita* L., peppermint, (usually as var. *officinalis* Sole).
(3) *M. spicata* L., spearmint (*M. viridis* Hort.)
(4) Other species.

Aromatic perennial herbs, mostly of Old World origin but widely naturalized in the United States; grown commercially, especially (2) and (3) as sweet herbs and for oil used in flavoring (includes *M. crispa* which yields spearmint oil); chiefly in Michigan, Indiana, Oregon, and Washington.

Alternaria sp., stem canker (?secondary). Mich. (2,3).
Cercospora menthicola Tehon & Daniels, leaf spot. Ill., Tex. (1).
Erysiphe cichoracearum DC., powdery mildew. Colo., Iowa, Wash. (1); Utah (4).
E. galeopsidis DC.—Iowa (1).
E. polygoni DC.—Tex. (1).
Fusarium sp., stem canker (?secondary). Mich., Wash. (2).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Leptosphaeria substerilis Pk., on leaves. N.Y. (2).
Meloidogyne spp., root knot nematodes. (1, var *piperascens*; 2).
Phyllosticta decidua Ell. & Kell., leaf spot. Occasional, Maine to Ohio, Iowa, and Wis. (1,2,3,4).
Puccinia angustata Pk. var. *typica* Arth. (O,I), rust. Calif., Mont., S.Dak., Wis. (1). II and III on *Scirpus* and *Eriophorum* spp.
P. menthae Pers. (O,I,II,III). Eastern and Central States to Tex. and the Pacific coast, commonly on (1) and (3), occasionally on (2) and (4). Includes

the form sometimes distinguished as var. *americana* Pk.

Ramularia menthicola Sacc., leaf spot. Calif., Maine, Mont., Oreg., Wash., Wis., Wyo. (1).

R. variata J.J.Davis—Wis. (1).

Septoria menthicola Sacc. & Letendre, leaf spot. Wis. (1).

Sphaceloma menthae Jenkins, anthracnose. Ind. (1,2,3, 4), Mich. (2,3), Md. (2).

Sphaerotheca humuli (DC.) Burr., powdery mildew. Wash. (1).

Verticillium albo-atrum Reinke & Berth., wilt. Ind., Mich. (2,3); Oreg. (2).

Micromeria

M. chamissonis (Benth.) Greene, yerba-buena.

Trailing perennial herb of Pacific Coast States, used in rock gardens.

Puccinia menthae Pers. (O,I,II,III), rust. Calif., Idaho, Oreg., Wash.

Monarda, beebalm, horsemint

(1) *M. didyma* L., Oswego-tea.
(2) *M. fistulosa* L., wildbergamot.
(3) *M. punctata* L., horsemint, dotted Monarda, spotted beebalm.
(4) Other species.

Perennial herbs of the Eastern (1) or Eastern and Central States and westward (2,3); grown for ornament, especially (1) and (2); minor honey plants in the Prairie States.

Cercospora sp., leaf spot. Okla. (4).

Phyllosticta decidua Ell. & Kell., leaf spot. Nebr., Tex. (2); Okla., Tex., Wis. (3); Kans., Okla. (4).

P. monardae Ell. & Barth.—Kans. (4).

Puccinia angustata Pk. (O,I), rust. Nebr., Wis. (2).

P. menthae Pers. (O,I,II,III). General from Maine to Miss., Tex., and Idaho, especially on (2) and (3); occasional (1,4).

Ramularia brevipes Ell. & Ev., leaf spot. Tex. (2,3), Ala. (4).

R. variata J.J.Davis—Wis. (2).

Sclerotium rolfsii Sacc., southern blight. Tex. (2,3,4).

Synchytrium holwayi Farl., leaf gall. Iowa, Wis. (2,4).

Mosaic—unidentified virus. Ind. (2).

Monardella

(1) *M. odoratissima* Benth.
(2) Other species.

Perennial herbs of the Far West for the most part; sweet-smelling; used in rock gardens.

Phyllosticta monardellae W.B.Cooke, leaf spot. Calif. (1).

Placosphaeria shastensis Sprague & W.B.Cooke, on stems. Calif. (1).

Puccinia menthae Pers. (O,I,II,III), rust. Calif., Nev., Oreg., Utah (1); Calif., N.Mex., Oreg. (2). The form on these hosts is sometimes distinguished as *P. monardellae* Dudley & C.H.Thompson.

Nepeta

(1) *N. cataria* L., catnip.
(2) *N. hederacea* (L.) Trev., ground-ivy.

Old World perennials, widely naturalized in the United States: (1) sometimes grown as a sweet herb, useful as a honey plant but often a weed; (2) creeping perennial of Eurasia, used as ground cover in shade.

Ascochyta nepetae J.J.Davis, leaf spot. Wis. (1).

Botrytis cinerea Pers. ex Fr., gray mold. Alaska (1).

Cercospora nepetae Tehon, leaf spot. Ill., Tex. (1).

Didymella catariae (Cke. & Ell.) Sacc., on stems. N.J., Ohio (1).

Fusarium sp., wilt. Ga. (1).

Phyllosticta decidua Ell. & Kell., leaf spot. Ohio (1); Ill., Ind., N.J., Wis. (2).

Pseudomonas tabaci (Wolf & Foster) F.L.Stevens, bacterial leaf spot. Wis. (1).

Rhizoctonia solani Kuehn, root rot. Tex. (1).

Sclerotium rolfsii Sacc., southern blight. Tex. (1).

Septoria alabamensis Atk., (nomen nudum), leaf spot. Ala. (2).

S. nepetae Ell. & Ev.—Tex., Wis. (1).

Mosaic—virus. In part unidentified, in part cucumber mosaic virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.). Ind., Iowa, Kans., Mich., Wis.

Ocimum

(1) *O. basilicum* L., basil.
(2) *O. micranthum* Willd., American basil.

Annual herbs of tropical Asia (1) or America (2); (1) cultivated as a sweet herb.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. ?Fla. (1).

Sphaerotheca humuli (DC.) Burr., powdery mildew. P.R. (2).

Physostegia, false-dragonhead

(1) *P. virginiana* (L.) Benth.
(2) Other species.

Perennial herbs of the Eastern and Southern States; (1) cultivated for ornament.

Mycosphaerella physostegiae W.A.Jenkins, leaf spot. Ga., Va. (1). Conidial stage=*Cercospora physostegiae*.

Plasmopara cephalophora J.J.Davis, downy mildew. Wis. (2).

Puccinia physostegiae Pk. & G.W.Clint. (III), rust. Ind., N.H., N.Y. (1); Mont., N.Y. (2).

Rhabdospora physostegiae Pk. (nomen nudum), on stems. N.Y. (1).

Sclerotinia sclerotiorum (Lib.) d By., stem rot. Maine (1).

Sclerotium rolfsii Sacc., southern blight. Va. to Okla. and Kans. (1). The form sometimes distinguished as *S. delphinii* is reported also in Conn., N.J., N.Y., and Wis.

Septoria physostegiae Ell. & Ev., leaf spot. Ill., Wis. (1).

Prunella, selfheal

P. vulgaris L., heal-all, Carpenter-weed.

Perennial herb of Europe, widely naturalized in the United States; sometimes used for ground cover or grown for ornament, useful to wildlife.

Erysiphe cichoracearum DC., powdery mildew. Pa.

Gibberidea abundans (Dobroz.) Shear, tar spot. Maine, Wash.

Linospora brunellae Ell. & Ev., leaf spot. Idaho, Wash., Alaska.

Phyllosticta brunellae Ell. & Ev., leaf spot. Tex., Wash.

Pythium palingenes Drechs. and *P. polytylum* Drechs., root necrosis. Va.

Ramularia brunellae Ell. & Ev., leaf spot. Ill., Ind., N.Y., Ohio, Tex., Va., Wis. *R. brunellae* Briard & Har. has priority.
Sclerotium rolfsii Sacc., southern blight. Tex.
Septoria brunellae Ell. & Holw., leaf spot. General.
Sphaerotheca humuli (DC.) Burr., powdery mildew. Ill., Md., Miss. The var. *fuliginea* (Schlecht.) Salm. also reported in Ill., Ind., Miss., Wash., Wis.

Pycnanthemum, mountain-mint, basil

(1) *P. flexuosum* (Walt.) B.S.P.
(2) *P. virginianum* (L.) Durand & Jacks.
(3) Other species.

Perennial herbs of the Eastern and Central States and southward, sometimes grown for ornament or as sweet herbs; (2) is locally important as a honey plant.

Cercoseptoria blephiliae H.C.Greene, leaf spot. Wis. (2).
Cercosporella pycnanthemi Atk., leaf spot. Ala. (2).
Puccinia angustata Pk. (O,I), rust. Ind. (2).
P. menthae Pers. (O,I,II,III). Mass. to Va., Tex., and Iowa (1); Mass. to Ala. and N.Dak. (2,3); also Calif., Okla. (3).
Synchytrium cellulare J.J.Davis, leaf gall. Wis. (1).

Salvia, sage

(1) *S. azurea* Lam. (also *S.pitcheri* Torr.), blue sage.
(2) *S. coccinea* Juss., Texas sage.
(3) *S. greggii* A. Gray, autumn sage.
(4) *S. mellifera* Greene, black sage.
(5) *S. officinalis* L., sage.
(6) *S. splendens* Ker-Gawl., scarlet sage.
(7) Other species.

Numerous, mostly perennial, herbs or subshrubs, several native to Southern and South Central States and California, many to Mexico and Central America; also from Europe and Africa, (5) being from Mediterranean region and cultivated as a savory herb. Various species are cultivated for ornament; native species are minor or locally important honey plants.

Aecidium subsimulans Arth. & Mains (O,I), rust. Ariz. (7).
Aphelenchoides fragariae (Ritz.-Bos) Christie, leaf nematode. Del., N.J. (1).
Cercospora salviicola Tharp, leaf spot. Okla. (1), W.Va. (5), Tex. (7).
Didymella ramonae Fairm., on stems. Calif. (7).
Erysiphe cichoracearum DC., powdery mildew. Calif. (7).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Ariz., N.J. (7).
Mycosphaerella audibertiae Rehm, on stems. Calif. (7).
Peronospora lamii A.Braun, downy mildew. Iowa (7).
P. swinglei Ell. & Kell., downy mildew. Kans. (7).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3,6).
Puccinia ballotaeflorae Long (II,III), rust. Tex. (7). O and I unknown.
P. caulicola Tracy & Gall. (O,I,II,III). Iowa to Tex., N.Mex., and S.Dak. (on *S. lanceolata* Willd.); ?Tex. (3).
P. farinacea Long (O,I,II,III). Ala., Kans., Miss., Mo., Nebr., Okla. (1); Ariz., Tex. (7).
P. impedita Arth. & Mains (O,II,III). P.R. (2,7), V.I. (7).
P. mellifera Diet. & Holw. (I,III). Calif. (4,7), Nev. (4).
P. salviicola Diet. & Holw. (O,I,II,III). Fla., Tex. (2); P.R. (7).
P. vertisepta Tracy & Gall. (O,I,III). Ariz., N.Mex. (7).
Pythium debaryanum Hesse, damping-off. Ohio (6).
Ramularia salviicola Tharp, leaf spot. Tex. (7).
Rhizoctonia solani Kuehn, root rot, damping-off. Conn. (5); Conn., Ill., N.J., Ohio (6).
Sclerotium bataticola Taub., charcoal rot. S.C. (7).
S. rolfsii Sacc., southern blight. Ill. (5).
Septoria salviae-pratensis Pass., leaf spot. T.H. (2).
Sphaeropsis salviae Hollós, ?stem rot. Miss. (7).
Volutella flexuosa Cke. & Ell., on leaves. N.J. (7)
Yellows—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (1).
Spotted wilt—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (7).

Satureia

S. vulgaris (L.) Fritsch, basil: See *Clinopodium vulgare* L.

Scutellaria, skullcap

(1) *S. galericulata* L.
(2) *S. lateriflora* L., mad-dog skullcap.
(3) Other species.

Mostly perennial herbs, widely distributed in the Eastern and Central States: (1,2) native, useful as wildlife-food plants; (3) native or introduced; all sometimes grown for ornament.

Botrytis cinerea Pers. ex Fr., stem rot. Wash. (3).
Cercospora scutellariae Ell. & Ev., leaf spot. Ill., Miss., Mo., Tex. (3).
Erysiphe galeopsidis DC. (=*E. cichoracearum* DC.?), powdery mildew. Mich., N.Y., Wis. (1,2,3); Ill., Ind., Iowa, Kans., Ohio (2).
Microsphaera sp., powdery mildew. Ill. (2).
Phyllosticta decidua Ell. & Kell., leaf spot. Wis. (2); Tex. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Rhizoctonia solani Kuehn, root rot. Tex. (3).
Septoria scutellariae Thuem., leaf spot. Maine to Iowa and Wis. (1,2); this range and also Calif., Colo., Miss., Okla. (3).

Sphacele

S. calycina Benth., pitcher-sage.

Shrubby herb of California, sometimes grown for ornament.

Hendersonia varians Cke. & Harkn., on stems. Calif.
Uredo sphacelicola Diet. & Holw. (II), rust. Calif.

Stachys, hedgenettle, betony

(1) *S. ciliata* Dougl.
(2) *S. palustris* L., woundworth.
(3) *S. tenuifolia* Willd.
(4) Other species.

Mostly native perennial herbs; wildlife-food plants, some of ornamental value.

Cercospora stachydis Ell. & Ev., leaf spot. Iowa, Maine (2).
Cylindrosporium stachydis Ell., leaf spot. Ill. (2).
Erysiphe galeopsidis DC. (=*E. cichoracearum* DC.?), powdery mildew. Wash. (1); Ohio to Colo. and Mont. (2); N.Y. to Ind. and Wis. (3); this range and also N.C., N.Mex., Tex. (4).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H. (4).
Ovularia bullata Ell. & Ev., leaf spot. Calif. (4).
O. stachydis-ciliatae Pk.—Wash. (1).
Phyllosticta decidua Ell. & Kell., leaf spot. Mass. (2); Wis. (2,3).
P. palustris Ell. & Dearn.—Ill., Ohio (2).
Puccinia pallidissima Speg. (III), rust. Tex. (4).
Ramularia stachydis (Pass.) Massal., leaf spot. Oreg. (1).
Septoria stachydis Rob. in Desm., leaf spot. Ill., Miss., Wis. (2); Iowa, N.Y. (3); Calif. (4).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Calif. (4).
Synchytrium stachydis (*stachyii*) Cook, leaf gall. La. (4).
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). T.H. (4).

Teucrium, germander

T. canadense L., American germander, woodsage.

Perennial herb of woodlands in the Eastern and Central States; sometimes grown in wild gardens.

Cercospora teucrii (Schw.) Ell. & Kell. (*C. racemosa* Ell. & Martin), leaf spot. N.Y. to Miss., Tex., and Wis.
Erysiphe cichoracearum DC. (*E. galeopsidis* DC.), powdery mildew. Ill., Pa., Wis.
Gymnosporium harknessioides Ell. & Holw., on leaves. Iowa; (?superficial fungus, not a parasite).
Peronospora sp., downy mildew. Okla.
Phyllosticta decidua Ell. & Kell., leaf spot. Tex., Wis.
P. teucrii Sacc. & Speg.—Iowa.
Puccinia menthae Pers. (O,I,II,III), rust. Pa.

Thymus, thyme

(1) *T. serpyllum* L., wild thyme, mother-of-thyme.
(2) *T. vulgaris* L., common thyme.

Prostrate woody herb of the Mediterranean region, naturalized in the Northeast; grown in herb gardens, and as a minor honey plant.

Botrytis cinerea Pers. ex Fr., gray mold. Alaska (2).
Mycosphaerella pachyasca (Rostr.) Vest., on leaves and stems. Alaska (1).
Rhizoctonia solani Kuehn, root rot. Mass. (2).

Trichostema, bluecurls

T. dichotomum L., bastard-pennyroyal.

Annual herb of the Eastern and South Central States; sometimes grown in wild gardens.

Septoria trichostematis Pk., leaf spot. N.Y.

LAURACEAE

Benzoin

See *Lindera*

Cinnamomum

(1) *C. camphora* (L.) Nees & Eberm., camphor-tree.
(2) *C. zeylanicum* Nees, cinnamon-tree.

Trees native of southeastern Asia: Cultivated as an ornamental in Gulf States and California (1) and in Southern States (2); (1) occasionally naturalized.

Armillaria mellea Vahl ex Fr., mushroom root rot. Cosmopolitan (1).
Botryosphaeria ribis Gross. & Dug., on branches. Ala. (1).
Cephaleuros virescens Kunze, algal spot. Fla. to La., P.R. (1); Fla. (2).
Colletotrichum cinnamomi Tharp, on leaves. Tex. (2).
Colletotrichum sp., ?on leaves. Miss. (1).
Colletotrichum. SEE *Glomerella cingulata.*
Diplodia spp. (*D. camphorae* Tassi, *D. natalensis* P. Evans, *D. tubericola* (Ell. & Ev.) Taub.), canker and dieback. Widespread, Tex. (1). Probably a conidial stage of *Physalospora rhodina.*
Elsinoë sp., leaf spot. Miss. (1).
Gloeosporium camphorae Sacc. and *G. ochraceum* Patterson (=*Glomerella cingulata?*), canker, dieback, and leaf spot. Gulf States, Tex. (1).
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose. Gulf States (1); Fla. (2).
Hypoxylon rubiginosum Pers. ex. Fr.—Ga. (1).
Lembosia camphorae Earle, leaf spot. Fla. (1).
Leptothyrium pomi (Mont. & Fr.) Sacc., on twigs. Fla. (1).
Microsphaera alni DC. ex Wint. var. *cinnamomi* L.Olive, powdery mildew. La. (1).
Monochaetia sp., ?on leaves. Miss. (1).
Phoma sp., ?on leaves. Miss. (1).
Phomopsis sp. (?conidial stage of *Diaporthe perniciosa* Marchal =*D. eres* Nits.), on roots. Fla. and West Indies. (1).
Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora rhodina (Berk. & Cke.) Cke., on dead branches. Miss. (1).
Pratylenchus pratensis (De Man) Filip., in roots. Fla. (1).
Rosellinia bunodes (Berk. & Br.) Sacc., root rot. Tropical America (1).
CHLOROSIS—manganese deficiency. Fla. (1).

Cryptocarya

Cryptocarya spp.

Trees of the Southern Hemisphere, occasionally cultivated in southern United States.

Meliola cookeana Speg., black mildew. Tropical America.
M. peleae F.L.Stevens—T.H.

Laurus, laurel, sweetbay

L. nobilis Linn., sweetbay.

Small tree with dull green leaves, native to Mediterranean region; used decoratively; famed in poetry; leaves used in cookery and also used to form the laurel wreaths of the heroes of antiquity.

Corticium (*Pellicularia*) *koleroga* Cke., thread blight. S.C.

Lindera

(1) *L. benzoin* (L.) Blume, spicebush, benjamin-bush, wild-allspice, feverbush.

(2) *L. melissaefolium* (Walt.) Blume, southern spicebush.

Ornamental, woody, aromatic shrubs. Range 20,22,24,25,26,27,28,29,30.

Asterina ramularis Ell.—Pa. (1,2).
Botryosphaeria ribis var. *achromogena* Gross. & Dug., canker. Md.
Cercospora petersii (Berk. & Curt.) Atk. (*Helminthosporium petersii* Berk. & Curt. =*?C. smilacina* Sacc.) has been reported on *Benzoin* but there are no authentically determined collections. SEE *Isariopsis linderae.*
Diaporthe sociata (Cke. & Ell.) Sacc. Mass., Md., N.Y., W.Va.
Dothidea linderae Gerard, on branches. N.Y., Pa.
Gloeodes pomigena (Schw.) Colby, on branches. Ind.
Gloeosporium falcatum Dearn. & House, on leaves. N.Y.
Glomerella cingulata (Ston.) Spauld. & Schrenk (*Gloeosporium fructigenum* Berk.), on twigs and fruits. N.J.
Hendersonia linderae Sacc., on branches. N.Y.
Hymenochaete agglutinans Ell., on trunk. Conn.
Isariopsis linderae (Ell. & Ev.) Sacc. (*Helminthosporium petersii* Berk. & Curt. in part), on leaves. Ala., N.J., W.Va.
Microdiplodia linderae (Ell. & Ev.) Tassi, on branches. Mich., N.Y.
Microdothella ramularis (Ell.) Th. & Syd., on twigs. Pa.
Nectria ochroleuca (Schw.) Berk., on bark. Pa.
Phoradendron flavescens Nutt., mistletoe. Eastern States.
Phyllosticta linderae Ell. & Ev., leaf spot. Del., Ind., W.Va.
P. lindericola Ell. & Ev., leaf spot. W.Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke. (*?Sphaeropsis linderae* Pk.), on branches. Occasional.
Solenia anomala (Pers. ex Fr.) Fckl.—Tenn.
Trametes malicola Berk. & Curt.
Valsa linderae Pk., on dead branches. Ind., N.J.

Litsea

L. aestivalis (L.) Fern., pond-spice.

Deciduous shrub. Range 25,28,29,30. Sometimes grown for ornament.

Cercospora olivacea (Berk. & Rav.) Ell., leaf spot. Ga.

Nectandra

Nectandra spp.

Shrubs or trees of tropical America.

Asteridium portoricense Speg., black leaf spot. P.R.
Cephaleuros virescens Kunze, green scurf. P.R.
Helminthosporium glabroides F.L.Stevens, on leaves. P.R.
Irenina (*Meliola*) *glabroides* F.L Stevens, black mildew. P.R.
Lembosia microspora Chardon, black mildew. P.R.
Phyllachora litseae Koord., black leaf spot. C.Z.
P. nectandrae F.L.Stevens & Dalby—P.R., V.I.

Ocotea

Ocotea spp.

Trees or shrubs of tropical America; *O. catesbyana* (Michx.) Sarg. (=*O. coriacea* (Swartz) Britt.?) occurs in southern Florida.

Asteridiellina portoricensis (Speg.) Seaver & Toro, black leaf spot. P.R.
Cephaleuros virescens Kunze, green scurf. P.R.
Helminthosporium ocoteae F.L.Stevens, on leaves. P.R.
Irenina (*Meliola*) *glabroides* F.L.Stevens, black mildew. P.R.
Lembosia microspora Chardon, black mildew. P.R.
Meliola ocoteae F.L.Stevens, black mildew. P.R.
Phyllachora catesbyana Chardon, black leaf spot. Fla.
P. nectandrae F.L.Stevens & Dalby.—V.I.
P. ocoteicola F.L.Stevens & Dalby.—P.R.
P. perplexans Chardon—P.R.

Persea

(1) *P. americana* Mill., avocado.

Tree of tropical America, cultivated for edible fruit, chiefly in California, Florida, Hawaii, and Puerto Rico. Three types or botanical varieties are recognized, which are, in increasing order of cold resistance, West Indian, Guatemalan, and Mexican (*P. americana* var. *drymifolia* (Schlecht. & Cham.) Blake).

(2) *P. borbonia* (L.) Spreng., redbay (including *P. pubescens* (Pursh) Sarg., swampbay).

Evergreen trees. Range 17,20,28,29,30,31.

Alternaria sp., fruit rot. Calif. (1).
Armillaria mellea Vahl ex Fr., root rot. Calif. (1).
Asterina delitescens Ell. & G.Martin, black leaf spot. Va. to Fla. and Tex. (2).
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches. Fla. (2).
B. ribis var. *chromogena* Shear, N.E.Stevens, & M.S. Wilcox (*Dothiorella gregaria* Sacc.), branch canker, fruit rot. Calif. (1).
Cephaleuros virescens Kunze, algal leaf spot, green scurf. Fla., P.R. (1); green scurf. Gulf States (2).
Cercospora sp. (*?C. purpurea* Cke. or *C. perseae* Ell. & G.Martin), spot or blotch of leaves and fruit. Fla., Ga., Tex., T.H. (1).
C. purpurea Cke., leaf spot. Ga. to Fla., and Miss. (2).
Cladosporium citri Mass.: SEE *Sphaceloma perseae.*
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1).
Coccoidella scutula (Berk. & Curt.) Hoehn., on leaves. N.C. to Fla. (2).
Colletotrichum gloeosporioides Penz., black spot and ripe rot of fruit, also on leaves and twigs. General, Tex. (1). Conidial stage of *Glomerella cingulata.*
Coryne gelatinosa (Ell. & G.Martin) Rehm, on leaves. Fla. (2).
Diplodia theobromae (Pat.) Nowell (*D. cacaoicola* P. Henn., *D. natalensis* P. Evans), dieback, stem-end rot of fruit. Fla., West Indies (1). Conidial stage of *Physalospora rhodina.*
Dothiorella spp., stem-end rot, Fla.; surface rot, ripe rot, also on leaves and twigs. Calif. (1). The California form is identified as the conidial stage of *Botryosphaeria ribis* var. *chromogena;* the Florida form is considered a different strain.
Englerula carnea (Ell. & G.Martin) Hoehn., black leaf spot. Fla. (2).
Fomes geotropus Cke.—Fla. (2).
F. supinus Sw. ex Cke.—Fla. (2).
Fusarium spp., fruit rot, bark disease. Calif. (1).
Gloeosporium sp., rusty blight. T.H. (1).
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose (leaf and fruit spot), dieback. General (1).
Helminthosporium fumosum Ell. & G.Martin, on leaves. Fla. (2).
Helminthosporium sp., smudgy spot on green twigs, rarely on leaves and fruit. Calif. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Hypoxylon spp.—Ga. (2).
Irene perseae (F.L.Stevens) Toro, black mildew. Fla., P.R. (1).
Irenopsis martiniana (Gaill.) F.L.Stevens, black mildew. Ala., Fla., Miss. (2).
Lembosia rugispora Tracy & Earle, black mildew. Miss., N.C. (2).
Meliola amphitricha Fr., black mildew. Fla., Miss. (2).
Meloidogyne sp., root knot nematodes. Resistant (1).
Mycosphaerella exutans (Cke.) Miles, on leaves. Tex. (2).
M. perseae Miles, leaf spot. P.R. (A *Mycosphaerella* stage is associated with *Cercospora* leaf spot in Fla.) (1).
Oidium sp., powdery mildew. Fla. (1).
Penicillium expansum Lk. ex Thom, blue mold dry rot. Calif. (1).
Pestalotia spp., leaf and fruit spot. Fla., Tex.; seedling blight. P.R. (1); on leaves. General (2).
Phomopsis sp., stem-end rot. Fla., Tex. (1).
Phyllachora gratissima Rehm, black leaf spot. P.R. (1).
Phyllosticta micropuncta Cke., leaf spot. Ala. (1); Md. to Fla. and Tex. (2).
P. perseae Ell. & G.Martin—Fla. (2).
Phyllosticta sp., leaf spot. Fla. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora fusca N.E.Stevens, on branches. Fla. (1).
P. obtusa (Schw.) Cke., canker, dieback. T.H. (1).
P. rhodina (Berk. & Curt.) Cke., on branches and fruit. Fla. (1).
Phytophthora cactorum (Leb. & Cohn) Schroet., collar rot, trunk canker. Calif., P.R. (1).
P. cinnamomi Rands, root rot, decline disease. Calif.; seedling blight. P.R. (1). Most important fungus associated with decline; also on roots.
P. citrophthora (R. E. & E.H.Sm.) Leonian, fruit rot. Calif. (1).
P. palmivora Butl., leaf spot, seedling blight. Fla. (1).
P. parasitica Dast., collar rot. Fla. (1).
Polyporus hirsutus Wulf. ex Fr. and *P. mutabilis* Berk. & Curt., wood rot. Fla. (2).
P. sulphureus Bull. ex Fr.—Fla. (2).
Pseudomonas syringae Van Hall, fruit spot, Calif. (1).
Pythium spp.—Calif. (1); associated with "decline" of trees.
P. ultimum Trow—Calif. (1); associated with "decline" of trees.
P. vexans d By., secondary root rot. Calif. (1).
Rhizopus nigricans Ehr., fruit rot. Cosmopolitan (1).
Sclerotinia sclerotiorum (Lib.) d By., collar rot. Calif. (1).
Sclerotium rolfsii Sacc., seedling blight. Fla. (1).
Sphaceloma perseae Jenkins, scab of fruit and foliage. Fla., Tex., P.R., West Indies (1).
Verticillium albo-atrum Reinke & Berth., wilt. Calif. (1).

SUNBLOTCH—virus. Calif. (1).

DIEBACK (nonparasitic)—copper deficiency. Fla. (1). See also *Colletotrichum, Diplodia,* and *Phytophthora.*

FRUIT SPOTS AND BLEMISHES (nonparasitic): Carapace spot, attributed to abrasion of young fruits—Calif.; end spot, attributed to desiccation of young fruits and overmaturity—Calif.; Thompson spot, to unknown physiological factors—Calif.; flesh-darkening, to low temperature—Calif.; russetting, cause unknown—Fla. (1).

LITTLE LEAF, ROSETTE—zinc deficiency. Calif., Fla. (1).

MELANORHIZA (water injury) AND ASPHYXIATION—defective drainage and aeration. Calif. (1). In part wilt caused by *Verticillium.*

MOTTLE LEAF—nutritional deficiency. Calif. (1).

TIPBURN—physiological, perhaps sodium chloride accumulation in poorly drained soil. Fla., Calif. (1).

Sassafras

S. albidum (Nutt.) Nees, white sassafras.

Shrub to small or large tree, with spicy-aromatic bark. Range 20,22,23,24,25,26,27,28,29,30; grown for wood and ornament, zone 4.

Actinothyrium gloeosporioides Tehon (=*Actinopelte dryina* (Sacc.) Hoehn.), leaf spot. Ill., N.J.
Apioporthe corni Wehm., on dead twigs. Pa.
Armillaria mellea Vahl. ex Fr., root rot. Pa.
Cryptovalsa sassafras (Ell. & Ev.) Berl., on branches. N.J.
Cytospora sassafras Ell. & Ev., on twigs. Mich., N.Y., W. Va.
C. sassafrasicola Tehon & Daniels. Ill.
Daedalea confragosa Bolt. ex Fr., trunk rot. Ind., N.Y.
Daldinia vernicosa (Schw.) Ces. & de N., wood rot. Ga., Va.
Diaporthe biglobosa (Cke. & Ell.) Sacc., on branches. N.J.
D. pardalota (Mont.) Fckl. (*D. sassafras* Dearn. & House).—N.Y.
Diplodia spp., on twigs and branches, associated with cankers and dieback. Species reported include *D. officinalis* Ell. & Ev.—Mich., N.Y.; *D. sassafras* Tracy & Earle—Miss.; *D. subcuticularis* Dearn. & House—N.Y.
Diplopeltis sassafrasicola Tehon & Stout, on leaves. Ill.
Fomes igniarius (L. ex Fr.) Kickx, white heart rot. Ohio, Va.
F. ribis (Schum. ex Fr.) Cke., red heart rot. Mo.
Gloeodes pomigena (Schw.) Colby, on twigs. Ind.
Glomerella cingulata (Ston.) Spauld. & Schrenk—Tex.
Gnomonia sassafras Ell. & Ev., on leaves. N.J., Ohio.
Griphosphaeria corticola (Fckl.) Hoehn., on branches. N.J.
Hymenochaete agglutinans Ell., wood rot. Va.
Hypoxylon spp., especially *H. sassafras* (Schw. ex Fr.) Berk., wood rot. N.Y. to Ga. and Mo.
Leptothyrium kellermanii Bub., on leaves. Ohio. (Spermatial stage of *Mycosphaerella sassafras?*)
Metasphaeria sassafrasicola Tehon & Stout, on leaves. Ill.
Mycosphaerella sassafras (Ell. & Ev.) Bub. & Kab., on leaves. N.Y. to Ga. and Kans.
Nectria sp., (*?N. galligena* Bres.), branch and trunk canker. Conn. to W. Va.
N. verrucosa (Schw.) Sacc., on branches. Pa.
Nummularia microplaca (Berk. & Curt.) Cke., on branches. Md. to Ala. and Ind.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Tex.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Mich.
Phyllosticta illinoensis Tehon & Daniels, leaf spot. Ill., Mass.
P. sassafras Cke., leaf spot. N.Y. to Ga., Tex., and Ill.
Phymatotrichum omnivorum (Shear) Dug.—Tex.
Physalospora obtusa (Schw.) Cke., on branches, ?canker and dieback. N.Y. to Ga. and Miss.
P. fusca N.E.Stevens and *P. rhodina* (Berk. & Curt.) Cke., on branches. Ala.
Polyporus spp., wood rot, sometimes on living trees: *P. gilvus* Schw. ex Fr.—Ind., La., Md.; *P. hirsutus* Wulf. ex Fr.—Ind., N.C.; *P. versicolor* L. ex Fr.—Ind., Md., Va.
Poria ferruginosa (Schrad. ex Fr.) Cke., wood rot.
Pseudodictya sassafrasicola Tehon & Stout, on leaves. Ill.
Schizophyllum commune Fr., wood rot. Pa., Va.
Septoria sp., leaf spot. N.Y.
Sphaeropsis spp., on branches, sometimes associated with cankers and dieback. Occasional, N.Y. to Ala. and Mo. (Probably the conidial stage of *Physalospora* spp., as *S. seriata* Pk. and *S. punctata* Dearn.

& House =*P. obtusa*. *S. sassafras* Cke. & Ell. is distinct, though probably not a *Sphaeropsis*).
Stigmatophragmia sassafrasicola Tehon & Stout, on leaves. Ill.
Trametes sepium Berk., wood rot. Ind.
Valsa spp., on branches, probably saprophytic and none connected definitely with the *Cytospora* spp. listed. Species reported include: *V. ceratophora* Tul.—N.J.; *V. laurina* Cke. & Ell.—N.J.; *V. subclypeata* Cke. & Pk.—N.Y., Va.
Valsaria nigrofacta (Cke. & Ell.) Sacc. N.J.
MOSAIC—suspected virus. N.Y.
YELLOWS—suspected virus. Tex.

Umbellularia

U. californica (Hook. & Arn.) Nutt., California-laurel.

Evergreen aromatic tree or shrub. Range 1,4,5,10; wood used commercially, grown for ornament, zone 7.

Anthostomella oreodaphnes (Cke. & Harkn.) Berl. & Vogl., on leaves. Calif.
Asterina anomala Cke. & Harkn., black mildew. Calif.
Ceuthospora sp., on leaves. Calif.
Cyclodomus umbellularia Hoehn., on leaves. Calif.
Diplodia harknessii Sacc., on leaves. Calif.
D. umbellulariae Ell. & Ev., on twigs. Calif.
?Erysiphe polygoni DC.—Calif.
Fomes applanatus (Pers. ex Fr.) Gill., white-mottled butt rot. Calif.
F. fomentarius (L. ex Fr.) Kickx and *F. igniarius* (L. ex Fr.) Kickx, white-mottled heart and sapwood rot. Calif.
Gloeosporium alleschericanum (P. Henn.) Wr., on leaves. Calif.
Lenzites betulina L. ex Fr., wood rot. Calif.
Letosphaeria odora (Cke. & Harkn.) Berl. & Vogl., on branches. Calif.
Mycosphaerella arbuticola (Pk.) House, on leaves. Calif., Oreg.
Nectria cinnabarina Tode ex Fr. and *N. coccinea* Pers. ex Fr., canker, dieback. Calif.
Polyporus versicolor L. ex Fr., wood rot. Calif., Oreg.
Poria ambigua Bres. and *P. ferruginosa* Schrad. ex Fr., wood rot. Calif.
Schizophyllum commune Fr., wood rot. Calif.
Stereum albobadium Schw. ex Fr., wood rot. Calif.
Thyridaria californica Rehm, on branches. Calif.
Valsa americana Berk. & Curt., on branches. Calif.

LECYTHIDACEAE

Bertholletia

B. excelsa Humb. & Bonpl., Brazil nut, and *B. nobilis* Miers.

Large trees of South America, furnishing nuts and oil. The following records are included because of the economic importance of decay of these Brazil nuts in commerce.

Actinomyces brasiliensis Spencer, endosperm decay.
Aspergillus flavus Mont., endosperm decay.
Cephalosporium bertholletianum Spencer, white mold.
Fusarium sp., dry rot.
Myxosporium sp., bitter rot.
Pellionella macrospora Spencer, black crust.
Phomopsis bertholletianum Spencer, endosperm decay.

LEGUMINOSAE

Abrus

A. precatorius L., rosarypea, crabseyevine, weatherplant.

Woody vine of tropical regions, grown for ornament and for the seeds which are used in beadwork.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla. Resistant.
Phyllachora perforans (Rehm) Sacc. & Syd., black leaf spot. P.R.

Acacia

(1) *A. angustissima* (Mill.) Ktze., prairie acacia. Range 11,16,17,20.
(2) *A. constricta* Benth., Mescat acacia. Range 10,11,14,16,17.
(3) *A. cyclops* Cunn. Cultivated acacia.
(4) *A. farnesiana* (L.) Willd., sweet acacia, huisache. (*Pithecellobium*). Range 5,10,11, 17,20,29,30.
(5) *A. greggi* Gray, long-flowered catclaw. Range 5,9,10,11,16,17,20.
(6) *A. koa* A.Gray
(7) *A. riparia* H.B.K.
(8) *A. roemeriana* Scheele, round-flowered catclaw. Range 11,16,17,20.
(9) *A. suffrutescens* Rose
(10) *A. tortuosa* (L.) Willd., catclaw. Range 11,17,20.
(11) *A. wrightii* Benth., Texas catclaw. Range 10,11,16,17,20.
(12) Other species.

Armillaria mellea Vahl ex Fr., mushroom root rot. Occasional (12).
Cephaleuros virescens Kunze, algal leaf spot. Fla. (12).
Cercospora sp.—Ga. (12); on introduced plant.
Clitocybe tabescens Scop. ex Bres., mushroom root rot. Fla. (4,12).
Coniothyrium decipiens Cke. & Harkn. (=*C. punctum* Cke. & Harkn.), on branches. Calif. (12).
Cylindrocarpon obtusisporum (Cke. & Harkn.) Wr., on twigs. Calif. (12).
Diaporthe medusaea Nits., on twigs. Calif. (12).
Diplodia spp. Several reported on branches, phyllodes, and leaves; possibly all *D. mutila* (Fr.) Mont. (imperfect stage of *Physalospora mutila* (Fr.) N.E. Stevens). Calif. (12).
Erysiphe polygoni DC., powdery mildew. Calif. (3).
Fomes applanatus (Pers. ex Fr.) Gill., heartwood rot. Calif. (12).
F. australis Fr.—(6).
F. fasciculatus Burt.—(6).
F. fullageri (Berk.) Cke.—(6).
F. hawaiensis Lloyd—T.H. (12).
Fusarium coccophilum Desm. (conidial stage of *Nectria coccophila* (Tul.) Wr.), on branches. Calif. (12).
F. lateritium Nees (conidial stage of *Gibberella baccata* (Wallr.) Sacc.) on twigs. Calif. (12).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Lophodermium acacicolum Tehon, leaf spot. T.H. (6).
Meliola koae F.L.Stevens, sooty mold. T.H. (6).
Meloidogyne spp., root knot nematodes. On cultivated species, occasional (12); on *Acacia decurrens* var. *dealbata* (Link) F.Muell., ?Fla.
Nectria ditissima Tul. and *Nectria* sp., twig and branch canker. Calif., S.C. (12).
Phoradendron californicum Nutt., mistletoe. Calif., Tex. (5).
P. flavescens (Pursh) Nutt., mistletoe. Tex. (8).
Phyllachora texana Tharp, leaf spot. Tex. (11).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4,5,12).
Physalospora fusca N.E.Stevens, leaf spot. Fla. (12).
Ravenelia spp., rust (autoecious genus):
R. australis Diet. & Neger, rust. Tex. (4).
R. gooddingii Long, rust. Ariz. (9).
R. hieronymi Speg., rust witches'-broom. Tex. (4).
R. igualica Arth., rust. Tex. (1).
R. roemerianae Long, rust. Tex. (8).
R. siliquae Long, rust. T.H., N.Mex., Tex. (4).
R. stevensii Arth., rust. P.R., St. Thomas. (7).
R. subtortuosae Long, rust witches'-broom. Tex. (10).
R. thornberiana Long, rust witches'-broom. Ariz., Tex. (2).
R. versatilis (Pk.) Diet., rust. Ariz., Calif., N.Mex., Tex. (5).
Schizophyllum commune Fr., wound rot. Calif. (12).
Strumella acaciae Cke. & Harkn., on twigs and branches. Calif. (12).
Uromyces koae Arth., rust. T.H. (6).
GUMMOSIS—Physiogenic, usually associated with deficient and irregular soil moisture. Calif. (12).

Albizzia

(1) *A. julibrissin* Durazz., silktree, "mimosa."
(2) *A. lebek* (L.) Benth., lebbek.

Cultivated trees, naturalized in Southeastern States (1) and in southern Florida (2). Range 29,30 (1).

Botryosphaeria ribis Gross. & Dug.—Ga. (1).
Cephaleuros virescens Kunze, algal spot. Fla. (2).
Coniothyrium insitivum Sacc., on twigs. (1).
Cytoplea insitiva (Sacc.) Petr., saprophyte. Cosmopolitan (1).
?Eutypella microcarpa Ell. & Ev.—Ga. (1).
E. stellulata (Fr.) Sacc., on dead twigs and branches. D.C. (1).
Fusarium lateritium Nees (*Gibberella baccata* (Wallr.) Sacc.), on twigs. Pa., S.C., Va. (1).
F. perniciosum Hepting, wilt. Ala., Ga., N.C., N.J., S.C., Va. (1).
Nectria cinnabarina Tode ex Fr. (sometimes reported in its imperfect stage, *Tuberculariа vulgaris* Fr.), dieback, canker, sometimes large branch cankers on upper surface of horizontal limbs. N.C., D.C., Va. (1).
N. coccinea Pers. ex Fr.—Ga. (1).
Phoma henningsii Sacc.—T.H. (2).
P. lathyrina Sacc., on pods. St. Croix and St. Thomas (2).
Phomopsis sp., on twigs. S.C. (1).
Phyllosticta divergens Sacc., on pods. P.R. (2).
Physalospora rhodina (Berk. & Curt.) Cke., on branches. Fla. (1).
Polyporus hirsutus Fr., *P. tulipiferus* (Schw.) Overh., and *P. versicolor* Fr., on dead twigs and branches. D.C. (1).
Schizophyllum commune Fr., on dead twigs and branches. D.C. (1).
Stereum albobadium (Schw.) Fr., on dead twigs and branches. D.C. (1).
Thyronectria austro-americana (Speg.) Seeler, on twigs. Ga., N.C. (1).
Tryblidiella rufula (Spreng. ex Fr.) Sacc. N.C. (1).

Alysicarpus

A. vaginalis (L.) D.C., alyceclover.

Annual, of the Oriental tropics, cultivated in the southern part of the Gulf States for forage and hay.

Heterodera marioni (Cornu) Goodney: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla.

Amorpha

(1) *A. canescens* Pursh, leadplant.
(2) *A. fruticosa* L., Indigobush.
(3) Other species.

Deciduous shrubs or subshrubs in Middle Western, Southern, Plains, and Rocky Mountain States. Sometimes cultivated.

Cercospora passaloroides Wint.: SEE *Cylindrosporium passaloroides.*
Cucurbitaria amorphae (Wallr.) Fckl. (=*C. elongata* (Fr.) Grev.) (*?Camarosporium amorphae* Sacc.), on branches. Kans., N.Mex.
Cylindrosporium passaloroides (Wint.) Gilman & Archer, leaf spot. Tex. (2); widespread.
Cytospora amorphae Ell. & Barth., on twigs. Kans., S. Dak.
Diaporthe amorphae Ell. & Ev., on branches. Ga., Kans., N.Dak.
Diplodia amorphae (Wallr.) Sacc., leaf spot. Tex. (2).
Erysiphe polygoni DC., powdery mildew. Iowa, Minn., Wyo. (1).
Phymatotrichum omnivorum (Shear) Dug.—Tex.
Physalospora obtusa (Schw.) Cke. (*?Diplodia amorphae* (Wallr.) Sacc.), on twigs. Ga., Kans., Nebr., N.Y.
Sphaeropsis amorphae Ell. & Barth. (=*Physalospora obtusa?*), on twigs and branches, Kans., N.Y. (2).
S. peckii Sacc.—Nebr. (2).
Stagnospora cytisporoides Ell. & Barth., on dead branches. Kans. (2).
Uropyxis amorphae (Curt.) Schroet, rust. General (1,2). Autoecious.
Valsa amorphae Ell. & Ev.—Kans. (2).
Valsaria insitiva (Tode ex Fr.) Ces. & de N.—Ga.

Amphicarpa, hogpeanut

(1) *A. bracteata* (L.) Fern. (*A. monoica* (L.) Ell.)
(2) *A. bracteata* var. *comosa* (L.) Fern. (*A. pitcheri* Torr. & Gray).

Twining perennials bearing subterranean pods, occurring in woodlands in the Northeastern and Central States; of food value to wildlife; sometimes a weed in cultivated areas.

Cercospora monoica Ell. & Holw., leaf spot. Ill., Ind., Iowa, Kans., Nebr., Ohio, Wis. (1,2).
C. simulans Ell. & Kell.—W. Va. (2).
Collectotrichum sp., leaf spot. W. Va.
Erysiphe polygoni DC., powdery mildew. General in northern part of host range (1,2).
Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. Md.
Puccinia andropogonis Schw. var. *onobrychidis* (Burr.) Arth. (O,I), rust. Ill., Iowa, N.Dak., Tenn., Wis. II and III on *Andropogon* spp.
Synchytrium aecidioides (Pk.) Lagh. (*S. decipiens*

Farl.), false rust, leaf gall. Maine to Ala., Kans., and N.Dak.
Trichosporium falcatae Dearn. & Barth., on leaves. Tex. (2).

Andira

(1) *A. jamaicensis* (W. Wr.) Urb.
Trees with conspicuous flowers. Tropical America.

Cercospora stevensii E.Young, leaf spot. P.R.
Dothidella andiricola Speg., on leaves. P.R.
Meliola andirae Earle, black mildew. P.R.
Omphalia flavida (Cke.) Maubl. & Rangel, leaf spot. P.R.
Polystigma pusillum Syd., leaf spot. C.Z., P.R., V.I.

Anthyllis, ladysfinger, kidneyvetch

A. vulneraria L., sandclover, woundworth.
European perennial herb, grown for forage on poor soils or sometimes for ornament.

Fusarium sp., leaf and stem blight. N.C.
Phyllosticta sp., leaf spot. N.C. *P. anthyllidis* Baudyš causes a leaf spot of this plant in Europe.

Apios, groundnut, wildbean

A. americana Medic. (*A. tuberosa* Moench), potatobean.
Twining perennial with tuberiferous stolons, in woodlands from the Atlantic coast to the Mississippi Valley; of food value to wildlife.

Alternaria sp., leaf spot. N.Y.
Cercospora tuberosa Ell. & Kell., leaf spot. Mass. to Fla., Tex., and Wis.
Erysiphe polygoni DC., powdery mildew. Ind.
Microsphaera alni DC. ex Wint., powdery mildew. Ala., Miss., Ohio.
M. difusa Cke. & Pk.—Miss., Nebr., Tenn.
Phymatotrichum omnivorum (Shear) Dug.—Tex.
Puccinia andropogonis Schw. var. *onobrychidis* (Burr.) Arth. (O,I), rust. Iowa, Minn., Nebr., Tex. (*Aecidium falcatae* Arth.)

Arachis, peanut

A. hypogaea L., common peanut.
Annual herb, probably native to South America, cultivated for edible seeds, the oil derived therefrom, and for livestock feed and hay. Cultivation chiefly in three districts—Virginia and North Carolina; Georgia and Alabama; Arkansas, Louisiana, Oklahoma, and Texas; grown on sandy soil in all the Southeastern and Gulf States.

Alternaria sp., secondary leaf spot. Fla., Mo., N.J., N. Mex., S.C.
Aphelenchoides spp., on roots. Ga.
Aphelenchoides sp., on stunted plants. Miss., Tex.
Ascochyta sp., ?leaf spot. Ark.
Aspergillus niger v. Tiegh., black mold. Tex.
Botrytis cinerea Pers. ex Fr., gray mold leaf and stem rot. Conn., Md., Miss., Tenn., Va.
Cercospora arachidicola Hori: See *Mycosphaerella arachidicola*.
C. personata (Berk. & Curt.) Ell. & Ev.: See *Mycospharella berkeleyi*.
Chaetomium fumicolum Cke., on greenhouse plant showing malnutrition. Md. (Beltsville).
Cladosporium herbarum Pers. ex Lk., black mold of pods. Cosmopolitan.
Colletotrichum sp., stem spot. Ark., Okla.
Criconemoides sp., root parasite. Ga.
Curvularia inaequalis (Shear) Boed., ?root rot. S.C.
Diaporthe sojae Lehman, stem blight. Va., W.Va.
Diplodia sp. (probably mostly *D. theobromae* (Pat.) Nowell), stem rot, pod rot. Va. to Fla. and Tex.; "concealed damage" (seed rot). Ala. See also *Physalospora rhodina*.
Fusarium spp., root and stem rot, pod spot, wilt. Occasional from Va. to Fla., Tex., and Mo. The species associated with these conditions and their causal relation thereto have not been critically determined. *F. solani* (Mart.) Appel & Wr. var. *phaseoli* Burkh. (=*F. solani* var. *martii* (Appel & Wr.) Wr. f. 3 Snyd., or *F. solani* f. *phaseoli* (Burkh.) Snyd. & Hans.) has been shown to cause a seedling root rot and wilt in Ga. *F. vasinfectum* Atk. (*F. oxysporum* f. *vasinfectum* (Atk.) Snyd. & Hans.), present on diseased roots in Ga., N.C., S.C., and Va., is reported parasitic to seedlings in N.C. It has been erroneously reported as *Neocosmospora vasinfecta* E.F.Sm. Other *Fusarium* spp. identified on peanuts are: *F. lateritium* Nees, on pods—S.C.; *F. moniliforme* Sheldon, on pods or associated with seedling root rot—Ark., N.C., and Okla.
Helminthosporium sp., root rot. Okla.
Heterodera marioni (Cornu) Goodney: See *Meloidogyne* spp.
Macrophomina phaseoli (Maubl.) Ashby, charcoal root and stem rot, seed rot ("concealed damage"). Colo., N.C., Okla., S.C., Tex. Includes reports as *Sclerotium bataticola* Taub.
Meloidogyne spp., root knot nematodes. Ala., Calif., Fla., Ga., N.C., Tex., T.H. Usually reported resistant.
Mycosphaerella arachidicola W.A.Jenkins, brown leaf spot, halo spot. General in the Southern States.
M. berkeleyi W.A.Jenkins, leaf spot. General, including T.H. and the West Indies.
Neocosmospora vasinfecta E.F.Sm., on roots and pods (saprophytic). Ala., Ga.
Panagrolaimus subelongatus (Cobb) Thorne, nematode associated with shoot proliferation. Tenn.
Penicillium sp., blue mold of pods, sometimes on nuts. Cosmopolitan.
Phoma sp., root and stem rot. Ala., Ga.; secondary leaf spot. Mo., Va.
Phyllosticta sp., leaf spot. Ala., Ark., Iowa, Miss., T.H. ?Spermatial stage of *Mycosphaerella*.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Physalospora rhodina (Berk. & Curt.) Cke., stem rot (?secondary), pod rot. Fla., Ga., Tex. As *Diplodia theobromae*, reported to cause 80 percent of the peg rot in Ala.
Pleospora sp., stem and leaf spot. Ark., Okla.
Pratylenchus spp., root necrosis and general stunting of growth. Ga.
Pratylenchus sp., associated with black pod spot. Va.
?*P. leiocephalus* Steiner, pod spot. Ala., Ga.
Pseudomonas solanacearum E.F.Sm., bacterial wilt. Ala., Fla., Ga., N.C., Va.
Puccinia arachidis Speg. (II,III), leaf rust. P.R. (and throughout the West Indies); occasionally in Fla., Ga., La., Tex. in the II stage only.
Pythium sp., root rot. Calif., Ga., N.C. *P. ultimum* Trow identified in N.C.
Rhizobium sp., root nodule bacteria. General in areas of commercial cultivation, inoculation required elsewhere; belongs to cowpea race.
Rhizoctonia sp. (*R. solani* Kuehn), seedling blight, root rot, nut rot. N.C. to Fla., Tex., and Okla.; Calif.
Rhizopus spp. (*R. artocarpi* Rac. and *R. stolonifer* (Ehr. ex Fr.) Lind), seed rot. S.C.

Sclerotium bataticola Taub.: See *Macrophomina phaseoli.*

S. rolfsii Sacc. (*Corticium rolfsii* Curzi), stem rot, nut rot, southern blight; also one form of seedcoat discoloration—blue stain. General in the Southern States from Va. to Fla., Ariz., and Okla.; T.H., P.R.

Stemphylium sp. (reported as *Macrosporium commune* Rab. f. *arachidis* Sacc.), leaf spot (secondary?). N.Dak.

Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. N.C.

Trichoderma viride Pers. ex Fr., seed rot. S.C.

Xanthomonas solanacearum (E.F.Sm.) Dows.: See *Pseudomonas solanacearum.*

Mosaic—mild and severe types, transmissible by rubbing and by grafting. N.C.

?Rosette—(*?Marmor arachidis* Holmes). T.H. Reported as "mosaic."

Stunt—unidentified virus, transmissible by juice. Tex.

Blue stain (seedcoat discoloration)—in part ascribed to reaction of seedcoat pigments to oxalic acid secretion of *Sclerotium rolfsii* growing on the shell; in part to oxidation under influence of moisture, especially on Spanish varieties in Ala., Ga., N.C., and Va.

Chlorosis—mineral deficiency associated with soil alkalinity or excess of lime. Fla., Tex.

Magnesium deficiency—Fla. ?experimental.

Manganese deficiency—?Ala., Ga.

Necrotic spot—cause unknown, ?nutritional deficiency. Ga.

"Pops"—empty but superficially normal pods, ?nutritional (potassium or magnesium) deficiency. N.C.

"Pouts"—a nonspecific term applied to various forms of stunting of peanut seedlings, but especially to the chlorotic spotting caused by thrips. N.C., Tex., Va.

Witches'-broom—cause unknown. Okla., Tex.

Astragalus

Astragalus spp., milkvetch, in part also poisonvetch, locoweed.

A large group of mostly perennial herbs, occurring commonly on prairies, plains, and foothills throughout the Western States, especially from South Dakota and Wyoming to Texas and Arizona; a few species ranging northward; also in the East and South. Some kinds are grazed by all classes of livestock when other forage is scarce, but their value is far offset by their hazard as poisonous plants, which is owing either to accumulation of selenium in their tissues, when growing on soils containing this element (*A. bisulcatus* (Hook.) A.Gray, *A. pectinatus* Dougl., *A. racemosus* Pursh, and others, are specific indicator-plants for selenium), or to toxic alkaloids (e.g. *A. mollissimus* Torr., purple loco). Some species furnish food for wildlife or are useful in erosion control; several are ornamental but have not been brought into cultivation.

Cercospora astragali Wor., leaf spot. On *A. cicer* L., Okla.; on *Astragalus* sp., Wis.

Colletotrichum carpophilum Kell. & Swing., on pods. On *A. caryocarpus* Ker, Kans.

Dendryphium nubilosum Ell. & Ev., on leaves and stems. On *A. flexuosus* Dougl., Mont.; on *A. parryi* A. Gray, Colo.

Didymaria astragali (Ell. & Holw.) Sacc., leaf spot. On *A. canadensis* L. in Ill., Iowa, Kans., Nebr., N.Dak., Wis.

Erysiphe polygoni DC., powdery mildew. Common on many species throughout their range.

Fusarium spp., wilt, stem rot. On *A. mollissimus*, Tex.; on *A. canadensis*, Wis. *F. moniliforme* Sheldon and *?F. tricinctum* (Cda.) Sacc. identified.

Fusicladium brevipus Ell. & Ev., on leaves. On *A. hypoglottis* L., Colo.

Gloeosporium davisii Ell. & Ev., on leaves. On *A. canadensis*, Wis.

Microsphaera euphorbiae (Pk.) Berk. & Curt., powdery mildew. On *A. neglectus* (Torr. & Gray) Sheldon and *A. striatus* Nutt., in Colo., Mont., and N.Y. American records of *M. astragali* (DC.) Trev. belong here.

Mycosphaerella pachyasca (Rostr.) Vest., on leaves. On *A. alpinus* L., S.Dak.

Napicladium astragali Ell. & Ev., leaf spot. On *A. chamaeleuce* A.Gray, Mont.; on *A. mexicanus* DC., Okla.

Peronospora trifoliorum d By, downy mildew. On *A. canadensis* and *A. lotiflorus* Hook. in Iowa, Kans., Minn., Mont., N.Dak., S.Dak., Wis. This has also been called *P. astragali* Syd. ex Gäum. A *Peronospora* sp. has been reported on *A. melilotoides* Pall. in Wash.

P. viciae (Berk.) d By. var. *astragali* Sacc.—Tex.

Phoma astragali Cke. & Harkn., on stems. On *A. bisulcatus, A. canadensis, A. goniatus* Nutt., and *A. menziesii* A. Gray, in Calif., Kans., and N.Dak.

Phyllosticta astragali Pk., leaf spot. Minn., Mont., Wash.

Phymatotrichum omnivorum (Shear) Dug.—Tex.

Physalospora astragali (Lasch) Sacc., *P. aurantia* Ell. & Ev., *P. megastoma* (Pk.) Sacc. (also reported as *Physalosporina megastoma* (Pk.) Wor.): See *Polystigma astragali.*

Polystigma astragali (Lasch) Hoehn., leaf spot. On *A. bisulcatus, A. flexuosus, A. hypoglottis, A. pectinatus,* and *A. striatus* Dougl., in Colo., Mont., N.Dak., Utah, Wyo. *Physalospora aurantia* Ell. & Ev., *P. astragali* (Lasch) Sacc., and *P. megastoma* (Pk.) Sacc. (=*Physalosporina megastoma* (Pk.) Wor.) are probably synonyms.

Pyrenophora comata (Auers. & Niessl) Sacc., on leaves. On *A. striatus*, Wyo.

Ramularia astragali Ell. & Holw., on leaves. On *A. canadensis*, Iowa.

Septoria astragalicola Pk., leaf spot. On *A. drummondii* Dougl. and *A. striatus* Nutt., in Ariz., Colo., and Mont.

Sphaerotheca humuli fuliginea (Schlecht.) Salm., powdery mildew. On *Astragalus* sp., Alaska.

Stemphylium sp., leaf spot. On *A. falcatus* Lam., Wash.

Thecaphora deformans Dur. & Mont., seed smut. On *A. allochrous* A.Gray, *A. bisulcatus, A. caryocarpus, A. diphysus* A.Gray, *A. drummondii, A. missouriensis* Nutt., *A. nuttallianus* DC., *A. scopulorum* Porter, *A. tenellus* Pursh, *A. thompsonae* Watson, *A. wootoni* Sheldon, Ariz., Colo., N.Mex., Utah, Wyo.

Uromyces lapponicus Lagh. (O,I,II,III), rust. On *A. alpinus* L. and *A. flexuosus* Dougl., from Alaska to Oreg. and Colo. The I stage is systemic.

U. punctatus Schroet. (II,III), rust. On numerous species from Wis. to Tenn., Tex., Calif., and Wash. O and I on *Euphorbia* spp. in Europe.

Volutella occidentalis Ell. & F.W.Anderson, on stems. On *A. drummondii* and *A. flexuosus*, Mont.

Mosaic—unidentified virus. Okla.

Baptisia, false-indigo

Baptisia spp.

Perennial herbs of the Eastern and Southern

States; of food value to wildlife; sometimes grown for ornament in wild gardens.

Anthostomella baptisiae (Cke.) Sacc., on stems. On *B. perfoliata* (L.) R.Br., S.C.
Cercospora velutina Ell. & Kell., leaf spot. On *B. australis* R.Br., Kans.; *B. bracteata* (Muhl.) Ell., Wis.; *B. leucantha* Torr. & Gray, Ill., Wis.
Coniothyrium baptisiae (Thuem.) Tassi, on stems. On *B. perfoliata*, S.C. *Sphaeropsis baptisiae* Thuem. and *Haplosporelia baptisiae* Petr. & Syd. are probably the same.
Diaporthe arctii (Lasch) Nits. (*D. baptisiae* Rehm), on stems. On *B. tinctoria* (L.) R.Br., N.J. *?D genistae* Rehm.
Erysiphe polygoni DC., powdery mildew. Frequent on all the species reported.
Leptosphaeria coniothyrium (Fckl.) Sacc.—On *B. lanceolata* Walt., Ga.
Marssonina baptisiae (Ell. & Ev.) Magn., leaf spot. On *B. leucantha*, Iowa. SEE *Stagonospora baptisiae*.
Microsphaera alni DC. ex Wint., powdery mildew. On *B. bracteata*, Wis.
Mycosphaerella sp. (*Sphaerella leucophaeae* Ell. & Kell.), on leaves. On *B. bracteata*, Kans.
M. baptisiicola (Cke.) Earle., on dead stems. On *B. leucantha*, S.C.; *B. tinctoria*, N.J., S.C.
M. granulata (Ell. & Ev.) Lindau, on stems. On *B. tinctoria*, N.J.
Phoma baptisiae P. Henn., on stems. On *B. australis*, S.C. *P. baptisiae* Cke. on *B. perfoliata* is older but appears to be a nomen nudum.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on stems. Ga.
Puccinia andropogonis Schw. var. *onobrychidis* (Burr.) Arth. (O,I), rust. On *B. australis*, Kans., Okla.; *B. leucophaea* Nutt., Kans., Nebr.; *B. tinctoria*, N.C.
Septoria baptisiae Cke., leaf spot. On *B. perfoliata*, S.C., Tex.
Stagonospora baptisiae (Ell. & Ev.) J.J.Davis, leaf spot. On *B. leucantha*, Wis. *Ascochyta baptisiae* J.J.Davis and probably *Marssonina baptisiae* (Ell. & Ev.) Magn. are the same.

Bauhinia, mountain-ebony or orchidtree

Bauhinia spp., especially *B. variegata* L.

Tropical trees and shrubs cultivated in southern Florida and California; ornamental vine in Puerto Rico.

Colletotrichum sp., leaf spot. Tex. (on *B. variegata*).
Meliola perexigua Gaill., black mildew. P.R.
Microsphaera diffusa Cke. & Pk., powdery mildew. Md.
Phyllosticta sp., leaf spot. (or on leaves.) Fla. (on *B. hookeri* F.Muell.).
Uromyces jamaicensis Vest., rust (O,III). P.R. (on *B. monandra* Kurz., and *B. pauletia* Pers.).

Caesalpinia

(1) *C. gilliesii* (Hook.) Wall., bird-of-paradise flower.
(2) *C. pulcherrima* (L.) Sw., dwarf poinciana.
(3) Other species.

Tropical shrubs or small trees, grown for ornament in the Far South and West Indies. (Royal poinciana or flamboyant, formerly *Poinciana regia* Bojer, now *Delonix regia* (Boj.) Raf., is included here.)

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Fla.
Botryosphaeria ribis Gross. & Dug. var. *chromogena* Shear, N.E.Stevens, & M.S.Wilcox, on branches. Fla.; severe dieback—Tex. (1).
Cercospora guanicensis E.Young, leaf spot. P.R. (3).
Clitocybe tabescens Scop ex Bres., root rot. Fla. (on *Delonix regia*).
Gloeosporium sp., anthracnose. Fla.
Pestalotia sp.—P.R. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Ravenelia humphreyana P.Henn. (II,III), rust. Fla., P.R.
Schizophyllum commune Fr.—Calif. (1).

Cajanus

C. cajan (L.) Millsp., pigeonpea.

Small shrub of Old World tropics, grown in warm regions for edible seeds, also for forage and as a cover crop.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. T.H.
Alternaria brassicae (Berk.) Sacc. f. *phaseoli* Brun., leaf spot. Tex.
Botryosphaeria xanthocephala (Syd. & Butl.) Th. & Syd., on dead stems. P.R.
Cephaleuros virescens Kunze, green scurf. P.R.
Cercospora cajani P. Henn. (*Mycovellosiella cajani* (P. Henn.) Rangel), leaf spot. P.R.
C. instabilis Rangel, leaf spot. P.R.
Colletotrichum cajani Rangel, anthracnose. P.R. The following records also may belong here: *C. lindemuthianum* (Sacc. & Magn.) Briosi & Cav., on stems in Fla., and *Gloeosporium* sp., on pods in Fla. and P.R.
Corticium salmonicolor Berk. & Br., pink scurf. P.R.
Diplodia cacaolicola P Henn. (=*Physalospora rhodina* (Berk. & Curt.) Cke.), stem rot. Fla., P.R.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. Calif.
Meloidogyne spp., root knot nematodes. Calif., Fla., T.H. Resistant.
Nectria grammicospora Ferd. & Winge, on stems. Fla., P.R., V.I.
Phoma cajani Rangel, on pods. P.R.
Phyllosticta cajani Rangel, leaf and pod spot. Fla., C.Z., P.R.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Rhizoctonia sp., stem rot. T.H.
R. ferruginea Matz, seedling blight. P.R.
Rotylenchus similis (Cobb) Filip., root nematode. T.H.
Sclerotium rolfsii Sacc., root and stem rot. P.R., T.H.
Thyronectria megalospora (Speg.) Seaver & Chardon, on stems. P.R.
Uromyces dolicholi Arth. (II,III), rust. Fla., Tex., P.R. O and I unknown.

Calliandra

Calliandra spp., false-mesquite.

Shrubs in southwestern United States and trees southward; occasionally cultivated.

Ravenelia reticulatae Long (II,III), rust. Ariz.

Canavalia

(1) *C. ensiformis* (L.) DC., jackbean.
(2) *C. gladiata* (Jacq.) DC., swordbean.

Trailing or twining herbs: (1) of tropical regions, grown for ornament, sometimes also

for forage in the Far South and West Indies; (2) grown chiefly for ornament.

Cercospora canavaliae Syd., leaf spot. P.R.
C. ternateae Petch, leaf spot. Ala.
Cerotelium canavaliae Arth. (II,III), rust. P.R. (1,2). O and I unknown.
Colletotrichum canavaliae Gonz. Frag. & Cif., pod spot. P.R. (1).
Fusicoccum canavaliae Lyon, secondary stem spot. T.H. (1).
Gloeosporium canavaliae Lyon, stem canker, dieback. T.H. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. ?Fla. (1), T.H. (1,2). Very resistant.
Nectria confluens Seaver, on pods. P.R. (2).
Pellicularia filamentosa (Pat.) Rogers, leaf blight. Cuba.
Septoria canavaliae Lyon, leaf spot. T.H. (1).
Vermicularia sp., on pods, secondary pod spot. *V. capsici* Syd. reported in Fla., *V. polytricha* Cke. in Ala. (1).
Mosaic—unidentified virus. Guam. (Also reported in Bermuda.)

Caragana

C. arborescens Lam., pea-tree.

Shrub or small tree cultivated especially for hedges and shelterbelts in the Northwestern States.

Agrobacterium rhizogenes (Riker et al.) Conn., hairy root. Ky. to Nebr. and Okla.
Ascochyta sp., leaf blight. Ohio.
?Botrytis cinerea Pers. ex Fr., pod blight. Mass.
Cucurbitaria caraganae Karst., on branches. Ohio.
Hendersonia septem-septata Vest., on twigs. Kans.
Pellicularia filamentosa (Pat.) Rogers, root rot of seedlings. N.Dak.
Phomopsis caraganae Bond. and *P. rudis* (Fr.) Hoehn. (*?Diaporthe medusaea* Nits.), on branches. Ohio.
Phyllosticta gallarum Thuem., leaf spot. Alaska, Wis.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Phytophthora cactorum (Leb. & Cohn) Schroet., wilt of seedlings. Mo.
Rhizoctonia solani Kuehn, damping-off. N.Dak.
Septoria sp., leaf blight. Minn.
Sphaeropsis sp., on branches. Iowa.

Cassia, senna

I. Medicinal Shrubs and Trees

(1) *Cassia acutifolia* Del., Alexandria senna.
(2) *C. fistula* L., golden-shower.

Small shrub (1) of Egypt and small tree (2) of India: (1) furnishing senna leaves, (2) cassia pods, both used in medicine; especially (2) established or sometimes cultivated in tropical America.

(3) *C. alata* L., ringworm senna.

Small tropical shrub reputed to possess medicinal properties.

Asterina elaeocarpi Syd., black mildew. P.R. (3).
Cercospora nigricans Cke., leaf spot. Miss. (1).
C. simulata Ell. & Ev., leaf spot. P.R. (3).
Microsphaera alni DC. ex Wint., powdery mildew. Md. (1).
Phyllachora canafistulae F.L Stevens & Dalbey, tar spot. P.R. (2).
Uredo lutea Arth. (II), rust. P.R. (on *Chamaefistula antillana* Britt. & Rose).

II. Ornamental Shrubs and Trees

(1) *Cassia artemisioides* Gaud., wormwood senna.

Australian shrub, grown for ornament in California and Texas.

(2) *C. corymbosa* Lam., flowery senna.

South American shrub, grown under glass, or in the open and sometimes naturalized in the Far South.

(3) *C. grandis* L. f., pinkshower.

Tropical American ornamental tree.

(4) *C. nodosa* Buch-Ham. ex Roxb., jointwood.

Asiatic tree introduced into tropical America.

Clitocybe tabescens Scop. ex Bres., root rot. Fla. (4).
Diplodia natalensis P.Evans. (=*Physalospora rhodina* (Berk. & Curt.) Cke.), dieback. Tex. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Tex. (1), Calif. (2).
Phyllachora canafistulae F.L.Stevens & Dalbey, tar spot. P.R. (3,4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora fusca N.E.Stevens and *P. rhodina* (Berk. & Curt.) Cke., on dead branches of *Cassia* sp. Fla., Miss.

III. Native Herbaceous Species

(1) *Cassia bauhinioides* A.Gray
(2) *C. marilandica* L., wild senna.

Perennials of plains and open ground: (1) in the Southwest, (2) eastward to Florida and Connecticut.

(3) *C. fasciculata* Michx., partridgepea, prairie senna, golden cassia.
(4) *C. occidentalis* L., coffee senna.
(5) *C. procumbens* L., sensitive partridgepea.
(6) *C. tora* L., sickle senna, sicklepod.

Weedy annuals of temperate (3,5) and tropical (4,6) America; furnish ground cover and are of food value to wildlife.

Aecidium chamaecristae Arth. (O,I), rust. Kans., Nebr., Tex. (3).
Cercospora atromaculans Ell. & Ev., leaf spot. Tex. (2); Ala., La. (6).
C. chamaecristae Ell. & Kell. (*?C. simulata* Ell. & Ev.), leaf spot. Kans., Nebr. (3).
C. nigricans Cke.—Tex. (2); Fla., Mo., S.C. (6).
C. occidentalis Cke.—Ala., Md. (2); S.C. to Fla. and Tex. (4).
C. pinnulaecola Atk., leaf spot. Ala. (5).
C. stimulata Ell. & Ev.—Mass. to Ark., Tex., and Wis. (2); P.R. (4).
C. torae Tharp—Tex. (6).
Diaporthe arctii (Lasch) Nits., on dead stems. N.Y. (2), Ga. (3).
Erysiphe polygoni DC., powdery mildew. Miss., Tex. (3); P.R. (4,6); Fla., Md. (6).
Fusarium oxysporum Schlecht. em. Snyd. & Hans. f. *vasinfectum* (Atk.) Snyd. & Hans., wilt. S.C.; also f. *batatas* Snyd. & Hans.
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, dieback. Ala. (3); Ga. (3,5).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

Leptosphaeria cassiicola Ell. & Ev., on dead stems. On *Cassia* sp., Tex.
Leptothyrium cassiicola Dearn. & House—N.Y. (2).
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. Ga. (4); Ala. (5).
Meliola chamaecristae Earle, black mildew. P.R.
Meloidogyne spp., root knot nematodes. Ga., T.H. (4,6); Ala., Fla., S.C. (6).
Phoma cassiae Sacc., on stems. S.C. (4); Fla. (6).
Phomopsis sp., dieback. S.C.
Phyllosticta cassiicola Kell. & Swing., leaf spot. Kans.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,3,5,6).
Pleospora cassiae Ell. & Ev., on dead stems. On *Cassia* sp., Tex.
Pratylenchus pratensis (De Man) Filip., in roots. T.H. (4).
Ramularia cassiicola (Ell. & Kell.) Heald & Wolf, leaf spot. Tex. (2).
Ravenelia cassiicola Atk. (II,III), rust. Fla., Ga., La., Miss., Ohio, Tex., P.R. (3); Ala., Miss. (5).
R. mesillana Ell. & Barth. (O,I,II,III), rust. N.Mex., Tex. (1). Other *Ravenelia* spp. on *Cassia* are: *R. cassiae-covesii* Long & Goodding in Ariz.; *R. papillifera* Syd. in Tex.; and *R. portoricensis* Arth. in P.R.
Rhizoctonia solani Kuehn, seedling blight. Fla. (6).
Rotylenchulus reniformis Linford & Oliveira, root nematode. Fla.
Septoria cassiicola Kell. & Swing., leaf spot. Kans., Tex., Wis.

Centrosema, butterfly-pea

(1) *C. pubescens* Benth.
(2) *C. virginianum* (L.) Benth.

Herbaceous vines: (1) limited to tropical America, (2) found also north to New Jersey and Texas; of food value to wildlife, (1) also grown for ornament.

Cercospora bradburyae E.Young, leaf spot. P.R. (1).
C. clitoriae Atk.—Ala. (2).
Colletotrichum sp., on pods. Ala. (2).
Meliola bicornis Wint., black mildew. P.R. (1,2).
Phyllachora galactiae Earle ex Seaver, tar spot. P.R. (2).
Mosaic—unidentified virus. P.R. (2).

Ceratonia

C. siliqua L., carob, St.-Johns-bread.

Tree of eastern Mediterranean region, cultivated in Florida and southern California.

Botryosphaeria ribis Gross. & Dug., canker—Calif. (?experimental).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Phytophthora cactorum (Leb. & Cohn) Schroet., root rot. Calif.
Verticillium albo-atrum Reinke & Berth., wilt. Calif.

Cercidium

C. floridum Benth., paloverde.

Small tree of southwestern deserts. Range 10,11.

Asteroma parkinsonia Ell. & Ev., on pods. Ariz.
Phoradendron californicum Nutt., mistletoe. Tex. to Calif.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. to Calif.

Cercis, redbud, Judas-tree

(1) *C. canadensis* L., red-bud. Range 22,23, 24,25,27,28,29,30.
(2) *C. chinensis* Bunge, Chinese red-bud. Cultivated.
(3) *C. occidentalis* Torr., western red-bud. Range 3,4,5,9,11,14,16,17.

Deciduous shrubs and trees grown for ornament, having handsome foliage and abundant showy flowers produced early in the spring.

Actinopelte dryina (Sacc.) Hoehn.—Ill. (1).
Botryosphaeria ribis Gross. & Dug. var. *chromogena* Shear, N.E.Stevens, & M.S. Wilcox, canker, dieback. Del., Md., N.C., N.J., Tex., Va. (1); natural infection—Md. (2); artificial inoculation—N.J.
Cercospora cercidicola Ell.: See *Mycosphaerella cercidicola*.
Cercospora cercidis Ray, leaf spot. Okla. (1).
Cercosporella chionea (Ell. & Kell.) Sacc., leaf spot. Ill., Ind., Kans., N.C. (1); Ind. (2).
Cryptodiaporthe sp.—Ga. (1).
Cuscuta exaltata Engelm., dodder. Tex. (3).
Cytospora cercidis Ell. & Ev. (nomen nudum), on twigs. W.Va. (1).
Diplodia cercidis Ell. & Ev., on twigs. N.Y., W.Va. (1); N.Y. (2).
Endothia viridistroma Wehm., on twigs. Ga. (1).
Gloeodes pomigena (Schw.) Colby, on twigs. Ind. (1).
Haplosporella cercidis Ell. & Barth., on dead branches. Kans. (1).
Hypoxylon rubiginosum Pers. ex Fr. and *H. truncatum* (Schw.) J.H.Miller—Ga. (1).
Lecanidion simile (Gerard) E.T.Butler, on dead twigs. Va. (1).
Macrophoma cercis Tehon & Stout, on leaves. Ill. (1).
Mycosphaerella cercidicola (Ell. & Kell.) Wolf (*Cercospora cercidicola* Ell.), leaf spot. General (1); Conn., Ky., Md. (2); Tex. (3).
Ovularia cercidis Camara, on leaves. Mo. (1).
Pezizella lythri (Desm.) Shear & B.O.Dodge, on twigs and branches. Va. (1).
Phoma cercidicola Fairm., on dead branches. N.Y. (2).
Phyllosticta cercidicola Ell. & Ev., leaf spot. Fla., Ind., W.Va. (1).
P. siliquastri Sacc. & Speg., on pods. Ala., Tex. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (1,3). Also on *C. reniformis* Engl.
Physalospora obtusa (Schw.) Cke., on dead branches. Occasional (1).
Polyporus adustus Willd. ex Fr., *P. gilvus* (Schw.) Fr., *P. versicolor* L. ex Fr., sapwood rot or on dead wood. Widespread (1).
P. hirsutus Wulf. ex Fr.—Md. (1).
Poria punctata Fr. and *P. spissa* (Schw.) Cke.—?Mich. (1).
Rosellinia medullaris (Wallr.) Ces. & de N.—Ind. (1).
Septobasidium sydowii Couch—Tex. (3).
Sphaeropsis cercidis Dearn. & Barth., on dead twigs. Kans. (1).
Stereum albobadium (Schw. ex Fr.) Fr., on dead branches following *Botryosphaeria* canker, ?heart rot. Md. (1).
Verticillium sp., wilt. Ohio (1).

Chamaecrista

See *Cassia*. III. Native Herbaceous Species.

Cicer

C. arietinum L., chickpea, garbanzo.

Annual herb of western Asia, cultivated in tropical America, occasionally in California for edible seeds.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla.
Mycosphaerella sp., stem necrosis. Ala.
Pythium ultimum Trow, root rot. Calif.
Rhizoctonia solani Kuehn, root and stem rot. Calif.
Mosaic—unidentified virus. Calif.

Cladrastis

C. lutea (Michx. f.) K.Koch, yellowwood.

Handsome small tree. Range 25,27,29; also cultivated as an ornamental.

Botryosphaeria ribis Gross. & Dug., on branches. Pa.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Okla.
Polyporus spraguei Berk. & Curt., wood rot. Md.
Verticillium albo-atrum Reinke & Berth., wilt. Ill.

Clitoria, butterfly-pea, pigeonwings

(1) *C. cajanifolia* (Presl) Benth.
(2) *C. mariana* L.
(3) *C. ternatea* L.

Twining herbs of tropical regions: (1) is grown as a cover crop; (3), and occasionally (2), grown for ornament.

Cercospora clitoriae Atk., leaf spot. Ala. (2); Fla., P.R. (3).
C. cruenta Sacc., leaf spot. Fla. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Uromyces neurocarpi Diet. (II,III), rust. P.R. (1).

Colutea

C. arborescens L., bladder-senna.

Shrub of Mediterranean region, cultivated as an ornamental.

Camarosporium coluteae (Pk. & Clint.) Sacc., on branches. N.Y. (Probably the conidial stage of the following.)
Cucurbitaria elongata (Fr.) Grev. (*C. coluteae* (Rabh.) Auers.), on dead branches.
Diplodia coluteae Schnabl (*?D. mutila* (Fr.) Mont.), twig blight. Pa.
Dothidea coluteae Berk. & Curt., on twigs. Pa.
Erysiphe polygoni DC., powdery mildew.
Ganoderma sp., root rot. Okla.
Phomopsis coluteae (Sacc. & Roum.) Died., on leaves. N.J.
Phytophthora cactorum (Leb. & Cohn) Schroet., wilt (seedlings). Mo.
Uromyces coluteae Arth., (II,III), rust. Kans. (Sometimes given as a variety of *U. genistae-tinctoriae* (Pers.) Wint.)

Coronilla, crownvetch

C. varia L.

Trailing herb of Europe, sometimes grown for ornament and naturalized in the Northeastern States. Several other species are cultivated as ornamentals.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematode. Va.

Coursetia

Coursetia spp.

Shrubs or small trees of southwestern United States.

Phragmopyxis acuminata (Long.) Syd. (O,III), rust. Ariz., Calif.

Crotalaria, rattlebox

(1) *C. intermedia* Kotschy
(2) *C. mucronata* Desv.
(3) *C. juncea* L., sunn-hemp.
(4) *C. retusa* L.
(5) *C. sagittalis* L.
(6) *C. spectabilis* Roth
(7) Species not determined or not designated.

Mostly coarse herbs or low shrubs of tropical regions; grown in warm countries, and now in the United States, as soil-building and cover crops, especially (1) and (2); (4) naturalized in Florida and tropical America and sometimes grown for ornament; (5), occurring from New England to Florida, Texas, and South Dakota, is of food-value to wildlife; (6) poisonous to farm stock, including mammals and poultry, owing to an alkaloid in seeds; (3) likewise poisonous but to a lesser degree, is a fiber-producing plant.

Alternaria sp., secondary leaf and pod spot. Fla., Tex. (6).
Botrytis cinerea Pers. ex Fr., leaf spot, blight, gray mold of pods. Fla. (6), N.C. (1,6).
Cercospora sp. (*?C. crotalariae* Sacc.), leaf spot. Fla., La., Miss., N.C. (2,6).
C. demetrioniana Wint., leaf spot. Del., Mo., Tex. (5); La. (7).
Colletotrichum crotalariae Petch, anthracnose. Fla. (2,6).
Chaetopyrena sp., on leaves. La. (7).
Clitocybe tabescens Scop. ex Bres., root rot. Fla. (2).
Diaporthe crotalariae Weber, stem canker. Fla. (6).
Erysiphe polygoni DC., powdery mildew. Fla. (6).
Fusarium sp., wilt, root rot. Fla. (1); La., Miss., Okla. (6); N.C. (1,6), Ga., Tex. (4). The wilt pathogen in La., Miss., and N.C. has been identified as *F. oxysporum* Schlecht. f. *tracheiphilum* (E.F.Sm.) Snyd. & Hans. It has been proved pathogenic to various *Crotalaria* spp. A similar form was associated with root rot in Fla.
F. udum Butl. var. *crotalariae* Padwick, wilt. Fla., La., Miss.
Helminthosporium sp. on pods. Fla. (6).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot, stem canker. Fla. (1,6); Okla., Tex. (2,6).
Meloidogyne spp., root knot nematodes. ?Fla. (2,3) resistant. Also on *C. saltiana* Andr., in T.H., but *C. spectabilis* appears to be immune.
Microsphaera diffusa Cke. & Pk., powdery mildew. Va. (1,3), P.R. (4); Md. (7).
Neocosmospora vasinfecta E.F. Sm., on dead stems. Ga. (4).
Oidium erysiphoides Fr. var. *crotalariae* Cif. & Frag., powdery mildew. Fla. (4); La., Miss. (6). Not a true *Oidium.*

Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. P.R. (4), Fla. (7).
Pellicularia filamentosa (Pat.) Rogers (*Rhizoctonia solani* Kuehn), stem spot. Fla. (1); La., Miss. (6). Also on *C. incana* L., in S.C.
Phoma sp., leaf spot. On *C. sagittalis* L., Mont.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,6).
Pyrenochaeta sp., secondary leaf spot. La., Miss. (6).
Rhizoctonia sp., stem canker. Fla. (1), La. (6).
R. solani Kuehn: See *Pellicularia filamentosa.*
Sclerotium rolfsii Sacc., root and stem rot. Fla. (1,2,6); Miss., N.C. (6). On *Crotalaria* spp. throughout the Southern States.
Septoria sp., leaf spot. N.C. (2,6).
Stemphylium sp., on stems. On *C. verrucosa* L., S.C.
LITTLE LEAF—?virus. Apparently different from mosaic. Fla. (6).
MOSAIC—unidentified virus(es). P.R. (2); N.C., Okla. (2,6); Tex. (6); Va. (1,2,6); Fla. (6); and also on *C. incana* L., Calif.; *C. lanceolata* Klotsch, *C. maxillaris* Klotsch, and *C. usaramoensis* Baker: *C. anagyroides* H.B.K. and *C. usaramoensis*, Okla., P.R.
BRONZING—magnesium deficiency. Fla.

Cyamopsis

C. tetragonoloba (L.) Taub., guar.

Drought-tolerant legume of India grown for green manure and for pods and seed which are used for stock food.

Alternaria sp., leaf spot, ?secondary. Calif. Probably a race of *A. brassicae.*
Fusarium sp., wilt. Ariz., Okla., Tex.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Calif., ?Fla. Resistant.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Rhizoctonia solani Kuehn, black root rot. Ariz.
Sclerotium rolfsii Sacc., root and stem rot. Ariz., Tex.
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennet, Beta virus 1 K.M.Sm.) Experimental—Calif.; ?natural—Ariz., Calif.
MOSAIC—unidentified virus. Ariz.
STREAK (?MOSAIC)—unidentified virus. Okla.
TOBACCO NECROSIS—virus (*Marmor lethale* Holmes). Wis.
GIRDLE — stem damage by alfalfa leafhopper (*Stictocephala*). Ariz.

Cytisus, broom

Cytisus spp.

European shrubs, cultivated as ornamentals. *C. scoparius* (L.) Link, Scotch-broom has become naturalized in range 1,2,4,27,28,29; valuable for erosion control.

Ceratophorum setosum Kirch. (*?Camarosporium laburni* Sacc., conidial stage of *Cucurbitaria laburni* (Pers.) Ces. & deN.).
Cylindrocarpon candidum (Lk.) Wr.: See *Nectria coccinea* Pers. ex. Fr.
Diaporthe spp. (*D. inaequalis* (Curr.) Nits., *D. rudis* (Fr.) Nits., *D. medusaea* Nits., and *D. sarothamni* (Auers.) Nits.), on dead branches. N.J., N.Y.
Dothidea tetraspora Berk. & Br., on dead branches. Calif.
Gloeosporium ?garganicum Sacc. & D. Sacc., on branches. N.J.
Nectria coccinea Pers. ex. Fr., on branches. Oreg.
Pestalotia polychaetia Cke. & Harkn., on twigs. Calif.
Phomopsis sp., on branches. Mass., N.J.
Physalospora obtusa (Schw.) Cke., on branches. Ala.
Pratylenchus pratensis (De Man) Filip., root lesion nematode.
Thielavia basicola Zopf, on dead roots. Wis. Probably following *Thielaviopsis basicola.*

Dalbergia

(1) *D. monetaria* L. f.
(2) Other species.

Tropical trees and woody climbers.

Meliola bicornis Wint., black mildew. P.R. (1).
Pseudothis pulchella (Spreg.) Th., black leaf spot. C.Z. (2).

Dalea (Parosela)

Dalea spp.

Shrubs or small trees, and some herbs, of the western Plains and southwestern deserts; *D. schottii* Torr., mesa dalea, and *D. spinosa* A.Gray, smoketree, are grown for ornament in the Southwest.

Cercospora daleae Ell. & Kell., leaf spot. Kans.
Phoradendron californicum (Pursh) Nutt., mistletoe. Calif. to Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia andropogonis Schw. var. *onobrychidis* (Burr.) Arth. (O,I), rust. On *D. enneandra* Nutt., S.Dak. to Kans. II and III on *Andropogon* spp.
P. paroselae Cummins (II,III), rust. On *D. mollis* Benth., Calif.

Delonix

D. regia (Boj.) Raf., royal poinciana, flamboyant-tree: See *Caesalpinia.*

Desmanthus, bundleflower

(1) *D. illinoensis* (Michx.) MacM., prairie-mimosa, prickleweed.

Perennial herb of moist open ground ranging from Ohio to Florida, Texas, and South Dakota; of food value to wildlife and is sometimes planted for ornament in wild gardens.

(2) *D. cooleyi* (Eaton) Trel. (*D. jamesii* Torr. & A.Gray). Similar plant to (1), on dry plains.

Cercospora desmanthi Ell. & Kell., leaf spot. Kans., La., Mo., N.Mex., S.Dak., Tenn. (1). This has been called *Camptomeris desmanthi* (Ell. & Kell.) Petr. and *Cercosporidium desmanthi* (Ell. & Kell.) Earle ex Dearn.
Erysiphe polygoni DC., powdery mildew. Ill., Miss. (1).
Ravenelia texensis Ell. & Gall. (II,III), rust. Tex. (2). O and I unknown.

Desmodium, tick-trefoil, beggarticks

Desmodium spp.

Mostly perennial herbs of dry woods and fields in the Eastern and Central States south to Florida and Texas. Several species of ornamental value, such as *D. canadense* (L.) DC., may be grown in wild gardens; most species are of food value to wildlife, and some are

grown as cover crops and for forage (*D. tortuosum* (Sw.) DC.) in the Far South. (Often the records do not designate the species.)

Cephaleuros virescens Kunze, green scurf. P.R.
Cercospora desmodii Ell. & Kell., leaf spot. On *D. glutinosum* (Muhl.) Wood, Ill., Kans., Mich., N.Y., and Wis.; on *D. molle* DC., Ala.; on *D. nudiflorum* (L.) DC., Iowa, Mo., and Wis.; on *D. rotundifolium* (Michx.) DC., Va.
C. desmodiicola Atk., leaf spot. On *D. canescens* (L.) DC., Okla.; on *D. rotundifolium*, Ind. Perhaps identical with the following.
C. melaleuca Ell. & Ev., on stems. On *D. tortuosum*, Fla.
Cladosporium infuscans Thuem., on living leaves. On *D. strictum* (Pursh) DC., S.C.
Colletotrichum uncinatum (Berk. & Curt.) Duke, on stems. On *D. nudiflorum*, ?N.C.
Diaporthe arctii (Lasch) Nits., on stems. N.J., N.Y.
Erysiphe polygoni DC., powdery mildew. On *D. canescens*, Ohio, Tex.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Isthmospora glabra F.L.Stevens, leaf spot. Tex.
Meliola bicornis Wint., black mildew. P.R. and C.Z.
Meloidogyne spp.; root knot nematodes. On *D. molle* and *D. strictum* (very resistant), ?Fla.; on *D. triflorum* DC., T.H.
Microsphaera alni DC. ex Wint. var. *ludens* Salmon, powdery mildew. On *D. canadense*, Wis.
M. diffusa Cke. & Pk., powdery mildew. On numerous species throughout the range; also in tropical America.
Mycosphaerella sp. (*Sphaerella desmodii* Wint.) On *D. canescens*, Mo.
Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. From Maine to Fla., Miss., and N.Dak., P.R. The collections on *Desmodium* have also been referred to P. *paraguayensis* Speg., questionably distinct.
Phakopsora meibomiae Arth. (II,III), rust. On *D. incanum* DC., P.R. O and I unknown.
Phyllachora simillima (Berk. & Rav.) Sacc., tar spot. On *D. lineatum* (Michx.) DC., S.C.
P. stevensii Syd., tar spot. C.Z.
Phyllactinia corylea Pers. ex Karst., powdery mildew. On *D. canadense* and *D. glutinosum*, Iowa.
Phyllosticta desmodii Ell. & Ev., leaf spot. On *D. canadense*, Iowa, Ill., Wis.; on *D. illinoense* A.Gray, Wis.; on *D. rotundifolium*, Ind.
P. desmodiicola Speg.—Tex.
P. macroguttata Earle, leaf spot. On *D. perplexum* Schub., Ala.
P. meibomiae Seaver, leaf spot. On *D. perplexum*, Ill.; *D. rhombifolium* DC., Fla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pseudomonas syringae Van Hall, bacterial spot. On *D. canescens*. Ind.
Puccinia andropogonis Schw. var. *onobrychidis* (Burr.) Arth. (O,I), rust. On *D. glutinosum*, Minn., Wis.; on *D. perplexum*, Ala. II and III on *Andropogon* spp.
Ramularia desmodii Cke., leaf spot. On *D. canadense* in Ill., Iowa, Kans., Miss., Nebr., and Wis.; *D. canescens*, Nebr.; *D. ciliare* (Muhl.) DC., S.C.; *D. cuspidatum* (Muhl.) Loud., Kans.; *D. illinoense*, Kans., Wis.; *D. lineatum* (Michx.) DC., La., Miss., and S.C.; *D. paniculatum* (L.) DC., Wis.; *D. perplexum*, Ala., Tex.
Sclerotium desmodii Thuem., on leaves. On *D. rotundifolium*. S.C.
S. rolfsii Sacc., root and stem rot. On *D. molle* and *D. tortuosum*, Fla., Tex.
Stagonospora desmodii Ell. & Ev., on stems. On *D. tortuosum*, Fla.
Synchytrium aecidioides (Pk.) Lagh., leaf gall. On *D. canescens*, Miss., Tex.
Thecaphora deformans Dur. & Mont., seed smut. On *D. glutinosum*, N.J.; *D. nudiflorum*, Md., Pa., and Va.
Uromyces hedysari-paniculati (Schw.) Farl. (O,I,II, III), rust. On numerous species from N.Y. to Fla., Tex., and Minn.; also in tropical America. Aecial stage very rare.

Dolichos

(1) *D. biflorus* L., twinflower dolichos.
(2) *D. lablab* L., hyacinth-bean.

Herbaceous vines of Old World tropics, grown for edible seeds and for ornament in the Far South and tropical America.

Cercospora canescens Ell. & Ev. (*?C. cruenta* Sacc.), leaf spot. Fla., P.R. (2).
Erysiphe polygoni DC., powdery mildew. P.R. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. ?Fla. (1,2), S.C. (2).
Microsphaera euphorbiae (Pk.) Berk. & Curt., powdery mildew. Ind. (1).
Neocosmospora vasinfecta E.F.Sm., on dead stems. S.C. (2).
Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. N.C. (2).
Phakopsora vignae (Bres.) Arth. (II,III), rust. P.R. (2). O and I unknown.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Mosaic—unidentified virus. Mich. (2).

Drepanocarpus

D. lunatus (L. f.) Meyer

Small tree of West Indies.

Trabutia conica Chardon, black leaf spot. P.R.

Erythrina

Erythrina spp.

A genus of herbs, shrubs, or trees with large and showy butterfly-like flowers; prized as garden plants; includes the woody form of *E. herbacea* L. (*E. arborea* (Chapm.) Small), red-cardinal, a small tree of southern Florida and the Gulf coast; *E. flabelliformis* Kearney, a small tree of Arizona and New Mexico; and several species, such as *E. indica* Lam., coral-tree, and the herbaceous form of *E. herbacea*, coralbean, in tropical America, grown as ornamentals and for shade in plantations.

Cercospora erythrinae Ell. & Ev., on leaves. La., Tex.
C. erythrinicola Tharp—Tex.
Clitocybe tabescens Scop. ex Bres., root rot. Fla.
Colletotrichum erythrinae Ell. & Ev., on leaves. Fla.
Dicheirinia binata (Berk.) Arth. (II,III), rust. C.Z., P.R.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meliola bicornis Wint., *M. crenatissima* Syd., *M. erythrinae* Syd., black mildew. C.Z., P.R.
Meloidogyne sp., root knot nematodes.
Mycosphaerella erythrinae F.L.Stevens, on leaves. C.Z. (*M. erythrinae* Koord. has priority).
Nectria cinnabarina Tode ex Fr., on stems. Ala.
Pellicularia koleroga Cke., thread blight. Fla.
Phoma erythrinicola Tracy & Earle, on stems. Miss.

Phyllosticta erythrinicola E.Young, leaf spot. P.R.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Rhizoctonia ramicola D.A.Roberts, thread blight. Fla.
Verticillium sp. (probably *albo-atrum* Reinke & Berth.), wilt. Calif.

Eysenhardtia

E. polystachya (Orteg.) Sarg., kidneywood. Shrub or small tree. Range 10,11,17,20.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Galactia, milk-pea

G. elliottii Nutt.

Low, mostly prostrate or twining, perennial herbs of warm regions of America; wildlife-food plant.

Sphaceloma floridensis Bitancourt & Jenkins, anthracnose. Fla.

Genista, woodwaxen, whin

Genista spp.

Deciduous to half-evergreen shrubs of Europe and Africa, cultivated as ornamentals chiefly in zone 5 and southward; handsome yellow flowers; *G. tinctoria* L., dyer's greenweed, is hardy to zone 2 and is locally naturalized in the Eastern States. See also *Cytisus*.

Cytospora sp., on branches. N.Y.
Diplodia sp., on branches. ?dieback. Calif., N.J.
Dothidea tetraspora Berk. & Br. (*?D. collecta* (Schw.) Ell. & Ev.), on branches. N.J.
Diaporthe medusaea Nits. (*D. rudis* (Fr.) Nits.), on branches. N.J.
Erysiphe polygoni DC., powdery mildew. Mo.
Phoma genista Brun., on branches. Calif.
Phomopsis rudis (Fr.) Nits.: See *Diaporthe medusaea*.
Physalospora obtusa (Schw.) Cke., on branches. N.J., N.Y.
Uromyces genistae-tinctoriae (Pers.) Wint. (II,III), rust. Calif.

Gleditsia

(1) *G. triacanthos* L., honeylocust.

Deciduous tree of range 16,20,22,23,24,25,26, 27,29,30; includes also *G. aquatica* Marsh., water locust of range 20,25,28,29,30.

(2) *G. japonica* Miq., Japanese honeylocust. Tree of eastern Asia, cultivated in zone 5.

Aglaospora anomia (Fr.) Lamb., on twigs and branches. Pa. (1).
Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Central States (1).
Botryosphaeria rhizogena (Berk.) Sacc.: See *Nectriella rhizogena*.
B. ribis Gross. & Dug.—Ga. (1).
Cercospora condensata Ell. & Kell., leaf spot. Ill. to Kans., Nebr., and Wis. (1).
C. olivacea (Berk. & Rav.) Ell.—Ill. and Iowa to Miss. and N.C., also Tex. (1).
Cucurbitaria elongata (Fr.) Grev., frequent on dead twigs or on dead areas of living twigs; also branch canker. Ohio (1).
C. recuperata Th. (*Botryosphaeria gleditschiae* (Schw.) Sacc.), on branches. S.C. (1).
Cytospora gleditschiae (Ell. & Barth.) Ferd. & Winge, on dead branches. Kans. (1).
Daedalea ambigua Berk. and *D. elegans* Spreng. ex Fr., wood rot. Southern States (1).
Dothiorella gleditschiae Grove, on branches. Miss., S.C. (1).
Eutypella fraxinicola (Cke. & Pk.) Sacc.—Ga. (1).
Fomes spp. (*F. applanatus* (Pers. ex Fr.) Gill., *F. connatus* (Weinm. ex Fr.) Gill., *F. igniarius* var. *laevigatus* (Fr.) Overh., *F. marmoratus* (Berk. & Cke.) Cke., and *F. meliae* (Underw.) Murr.), heart rot of standing trees and wood rot of logs. Widespread; the last 3 species prevailing in the South (1).
Ganoderma curtisii Berk. and *G. lucidum* (Leyss. ex Fr.) Karst., wood rot, sometimes of roots or trunks of living trees in Southern States (1).
Gloeodes pomigena (Schw.) Colby, on branches. Ind.
Glomerella cingulata (Ston.) Spauld. & Schrenk, on leaves. Md. (1).
Haplosporella gleditschiae Grove, on branches. S.C. (?conidial stage of *Physalospora rhodina*.) *H. gleditschiicola* (Cke.) Ell. & Ev., on branches. Kans. (*?Physalospora obtusa*) (1).
Hendersonia sp., associated with *Cucurbitaria*, probably conidial stage (1).
Libertella gleditschiae Wint., on dead branches. Mo. (1).
Linospora gleditsiae J.H.Miller & Wolf, tar spot. Southern States to Nebr. and Tex. (1).
Macrophoma mamillaris (Berk. & Cke.) Tassi, on branches. S.C. (1).
M. triacanthi (Sacc.) Berl. & Vogl.: See *Dothiorella gleditschiae*.
Melasmia hypophylla (Berk. & Rav.) Sacc. and *M. gleditschiae* (Lév.) Ell. & Ev.: See *Linospora gleditsiae*.
Melasmia hypophila (Berk. & Rav.) Sacc.—Wis. (1).
Microsphaera alni DC. ex Wint., powdery mildew. Widespread (1).
M. ravenelii Berk.—(1).
Mycosphaerella sp.—(1).
Nectria cinnabarina Tode ex Fr., on branches. Ala., Mich., S.C. (1).
Parodiella perisporioides (Berk. & Cke.) Speg., on leaves. Mo. (1).
Phoma mamillaris (Berk. & Curt.) Sacc.: See *Macrophoma mamillaris*.
P. triacanthi Sacc.: See *Dothiorella gleditschiae*.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Ind., Tex. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Okla., Tex. (1).
Physalospora obtusa (Schw.) Cke., on branches. ?dieback. Widespread. (Reported variously as *Sphaeria gleditschiae* Schw., *Sphaeropsis triacanthi* Ell. & Barth., and *Haplosporella gleditschiicola* (Cke.) Ell. & Ev.) (1).
P. rhodina (Berk. & Curt.) Cke. (*Diplodia natalensis* P. Evans), on branches. Ala., S.C. (1).
Phytophthora citrophthora (R.E. & E.H.Sm.) Leonian, collar rot. Calif. (1).
Polyporus spp. (*P. adustus* Willd. ex Fr., *P. albus* Huds. ex Fr., *P. arcularius* Batsch ex Fr., *P. hydnoides* Sw. ex Fr., *P. pargamenus* Fr., *P. pulchellus* Schw., *P. sulphureus* Bull. ex Fr., *P. supinus* Sw. ex Fr., *P. tulipiferus* (Schw.) Overh., *P. versicolor* L. ex Fr.), wood rot, occasionally on living trees (1).
Poria ambigua Bres.—southern U.S. (1).
Ravenelia opaca Diet.—(III), rust. Ill. (1).
Schizophyllum commune Fr., wood rot, wound rot. Cosmopolitan (1).
Septobasidium curtisii (Berk. & Desm.) Boed. & Steinm., felt fungus. Ark., La. (1).
Sphaeropsis gleditschiae Cke.: See *Dothiorella gleditschiae*.
S. gleditschiicola Cke.: See *Physalospora obtusa*.

Sphaeropsis mamillaris Berk. & Cke.: See *Macrophoma mamillaris.*

S. triacanthi Ell. & Barth.: See *Physalospora obtusa.*

Thyronectria austro-americana (Speg.) Seeler (*T. sphaerospora* (Ell. & Ev.) Seaver), twig and branch canker, wilt. Mass. to S.C., Ala., La., Miss., Nebr., Tenn. (1); Mass. (2).

Xylaria mali Fromme, root rot. Va. (1).

Witches'-broom—Robinia virus 1 (Hartley & Haasis) Smith, *Chlorogenus robiniae* Holmes. Ky., Ohio, W.Va. (1).

Gliricidia

Gliricidia spp.

Trees or shrubs of tropical America, especially *G. sepium* (Jacq.) Steud., grown for ornament.

Cercospora gliricidiae Syd., leaf spot. P.R.

Pellicularia koleroga Cke., thread blight. P.R.

Glottidium

G. vesicarium (Jacq.) Harper, bagpod.

Annual of the Southeastern States; furnishes food for wildlife.

Cercospora glottidiicola Tracy & Earle, leaf spot. Miss., Tex.

Erysiphe polygoni DC., powdery mildew. Fla., Tex.

Gloeosporium glottidii Ell. & Martin, leaf spot. Tex.

Phoma clitoricarpa (Cke.) Sacc., on stems. Tex.

Phomatospora sesbaniae (Ell. & Martin) Sacc., leaf spot. Tex.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Glycine

Glycine max (L.) Merr., soybean.

Annual herb of eastern Asia, long cultivated there for edible seeds and forage; for many years grown in the Southern States as a forage and soil-building crop, and more recently cultivated in the Corn Belt for hay, oil, and edible seeds.

Alternaria spp., leaf spot (mostly secondary). Widespread. *A. atrans* Gibson *(?A. tenuis* Auct.), on leaves injured by sunburn, insects, and bacterial blight reported in Ariz., N.Y., Pa.; *A. brassicae* (Berk.) Sacc. f. *phaseoli* Brun. in Md.; *A. tenuis* Auct., secondary leaf spot in N.C., isolated from seeds in Minn., followed arsenical spray in Miss.; in Iowa, *Alternaria* sp. caused leaf spot on wounded leaves.

Ascochyta sp., on leaves. Ark., W. Va.

Aspergillus spp., on seed, especially immature seed or those with high moisture content. Reported from Ill. and Minn. but probably cosmopolitan. *A. flavus* Lk. ex Fr., *A. glaucus* L. ex Fr., and *A. ochraceus* Wilhelm predominated; *A. fumigatus* Fres. and *A. niger* v. Tiegh. also were found. *A. flavus* impaired vitality and germination.

Bacterium glycines (Nakano) Elliott and *B. phaseoli* E. F. Sm. var. *sojense* Hedges: See *Xanthomonas phaseoli* var. *sojense.*

B. glycineum Coerper and *B. sojae* Wolf: See *Pseudomonas glycinea.*

Botryodiplodia pallida Ell. & Ev. *(?Physalospora rhodina* (Berk. & Curt.) Cke.), on stems. Ala.

Botrytis cinerea Pers. ex Fr., gray-mold leaf spot, shoot blight. Conn., Ohio.

Cephalosporium gregatum Allington & Chamberlain, brown stem rot. Ill., Ind., Iowa, Ky., Mo., Ohio. Destructive where rotation is neglected.

Cercospora canescens Ell. & G. Martin *(?C. cruenta* Sacc., *Mycosphaerella cruenta* (Sacc.) Latham), leaf spot, also on pods and stems. Ala., Ill., Md., Miss., N.C., Tex., W. Va.

C. kikuchii T. Matsu & Tomoyasu, purple speck, ?stain (of seed); also leaf spot. Ind., Md., N.C., Va.

C. sojina Hara *(C. daizu* Miura) frogeye leaf spot. N.Y. to Fla., Okla., Iowa, and Mich. Sometimes associated with *Mycosphaerella phaseolicola* (Desm.) Sacc.

Colletotrichum sp., leaf spot or on stems. La.

C. glycines Hori: See *Glomerella glycines.*

C. truncatum (Schw.) Andrus & W. O. Moore, anthracnose.

Corynespora cassiicola (Berk. & Curt.) Wei *(Helminthosporium vignicola* (Kawamura) L. Olive), target spot. Ala., Ark., Fla., Ga., La., Miss., N.C., S.C.

Diaporthe sojae Lehman *(D. phaseolorum* (Cke. & Ell.) Sacc. var. *sojae* (Lehman) Wehm.), pod and stem blight. N.Y. and Mich. to Ga., La., Okla., Kans.; natural occurrence of *Diaporthe* stage in Iowa. According to Georgia Experiment Station, *D. sojae* is not the same as *D. phaseolorum;* it is saprophytic or weakly parasitic. According to Welch and Gilman, *D. phaseolorum* var. *sojae* and var. *batatatis* (Harter & Field) Wehm. can attack soybeans, the latter variety being more virulent.

D. phaseolorum (Cke. & Ell.) Sacc. var. *batatatis* (Harter & Field) Wehm., stem canker. Ill., Ind., Iowa.

Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y.

Erysiphe polygoni DC., powdery mildew. Del., Iowa, N.C., S.C., Tex., P.R.

Fusarium oxysporum Schlecht. f. *tracheiphilum* (E. F. Sm.) Snyd. & Hans. (*F. bulbigenum* Cke. & Mass. var. *tracheiphilum* (E.F.Sm.) Wr.), Fusarium wilt, blight. Pa. to Fla., La., Tex., and Nebr.; also Calif. Unidentified *Fusarium* spp. have been reported associated with root, stem, and pod rots of soybeans, and with impaired seed vitality.

F. scirpi C. R. Lambert & Fautry var. *acuminatum* (Ell. & Ev.) Wr., seed rot. N. Dak.

F. udum Butl. f. *crotalariae* Padwick, wilt—S.C. (experimental).

Glomerella cingulata (Ston.) Spauld. & Schrenk, on stems. Iowa, N.C.

G. glycines (Hori) Lehman & Wolf, anthracnose. Iowa, N.C., Mich. to Fla., Tex., and Nebr. Conidial stage resembles *Colletotrichum truncatum.*

Helminthosporium vignae L. S. Olive, zonate leaf spot. N.C. (=*Cercospora vignicola* Kawamura according to Liu).

H. vignicola (Kawamura) L. Olive, pod and seed spot. *Heterodera marioni* (Cornu) Goodey: See *Meloidogyne* spp.

Macrophomina phaseoli (Maub.) Ashby *(Sclerotium bataticola* Taub.), ashy stem blight. "leopard" spot on leaves and pods. N.J. to S.C., Tex., and Nebr.

Meloidogyne spp., root knot nematodes. Va. to Fla. and Tex., Okla.; Ariz., Calif., T.H.

Microascus trigonosporus Emmons & Dodge, on seeds. Ala.

Microsphaera sp., powdery mildew. N.C.

Mycosphaerella cruenta (Sacc.) Latham, leaf spot. Ga., Miss.

Myrothecium roridum Tode ex Sacc., secondary leaf spot. La.

Nematospora coryli Pegl., yeast spot (on seeds). N.C., S.C., Okla., Va.

Neocosmospora vasinfecta (Atk.) E.F.Sm., on stems. Ga.

Pellicularia filamentosa (Pat.) Rogers *(Rhizoctonia*

solani Kuehn), root and basal stem rot, canker. General.
Penicillium sp., seed rot (in germination). Ohio.
Peronospora manshurica (Naum.) Syd. ex Gäum., downy mildew. Eastern and Southern States to La., Iowa, Wis.
Phoma sp., on stems. Ill.
P. subcircinata Ell. & Ev.—S.C.
Phomopsis sojae Lehman: See *Diaporthe sojae.*
Phyllosticta glycinea Tehon & Daniels, leaf spot. Ill., Md., Mo., N.C., Va. Published as *P. glycineum.*
?P. phaseolina Sacc., leaf spot. Ga., N.C.
P. sojicola Massal.: See *Pleosphaerulina sojicola.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Okla., Tex.
Pleosphaerulina sojicola (Massal.) Miura, leaf spot. Md., N.J., N.Y., Wis.
Pseudomonas glycinea Coerper, bacterial blight. Eastern and Southern States to Tex. and Minn.
P. solanacearum E.F.Sm., bacterial wilt. N.C.
P. tabaci (Wolf & Foster) F.L.Stevens, wildfire. Md. to Ala., Ga., La., and Nebr.
Pythium spp. (commonly reported as *P. debaryanum* Hesse), neck rot, damping-off, root rot. Ill., Iowa, Minn., Mo., N.C., N.Dak. *?P. graminicola* Subr.—Iowa.
Rhizobium leguminosarum Frank em. Baldwin & Fred (more particularly the strain identified as *R. japonicum* (Kirchner) Buchanan), in root nodules. General.
Rhizoctonia sp. (*R. solani* Kuehn), root rot, stem canker. See *Pellicularia filamentosa.*
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Md., Iowa. N.Y., Va.
Sclerotium bataticola Taub.: See *Macrophomina phaseoli.*
Sclerotium rolfsii Sacc., southern blight. Va. to Fla., Tex., and Iowa.
Septoria glycines Hemmi, brown spot. Ark., Del., Ind., Iowa, Md., N.C., Wis.
Streptomyces scabies (Thaxt.) Waks. & Henrici—Iowa (experimental).
Thielavia basicola Zopf, on dead roots. N.C. Presence is indicator of *Thielaviopsis basicola* (Berk. & Br.) Ferr., a distinct entity, but the former characteristically fruits after the latter has killed the roots.
Xanthomonas phaseoli (E.F.Sm.) Dows. var. *sojense* (Hedges) Starr & Burkh., bacterial pustule, pustular spot. General.
X. solanacearum (E.F.Sm.) Dows.: See *Pseudomonas solanacearum.*

Bud blight, streak, leatherneck, top necrosis—Tobacco ring spot virus (*Marmor annularium* McK., *Annulus tabaci* Holmes, Nicotiana virus 12 K.M. Sm.). Midwestern U.S. Ohio to Ark., Ga., Nebr., S.Dak., and Minn.
Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Oreg., Wash.
Mosaic—virus (Soja virus 1 K.M.Sm.). General, T.H., scattered but uncommon. This is the common seedborne virus of soybeans. The following viruses have been shown experimentally infectious to soybeans: alfalfa mosaic, southern and yellow mosaic of bean, lima bean mosaic, enation mosaic of pea, and pea streak. Infection by one or more of these viruses may account for the variable symptoms—mottle, crinkle, stunt, and streak—described for soybean mosaic. Natural infection with yellow bean mosaic (Phaseolus virus 2) in Ill.
Unknown virus—chlorotic spots and lines. Ga.
Baldhead—loss of seedling growing point attributed to mechanical injury of seed, perhaps complicated by *Pythium* infection. Iowa.
Black patch—sterile fungus. Ga.
Manganese deficiency—?Ala., N.C., Tenn. Cause of interveinal chlorosis.
Yellowing—physiological, frequently due to potassium deficiency. Occasional in Eastern States. Yellowing resulting from deficiency of iron or of nitrogen also is reported.

Glycyrrhiza, licorice

G. lepidota (Nutt.) Pursh, American licorice, wild licorice.

Tall perennial of open, usually rich and moist, ground in the Central and Western States, occasionally eastward to New York; useful as a soil binder; also furnishes food for wildlife; sometimes a troublesome weed. Roots contain glycyrrhizin (licorice), but the commercial source is *G. glabra* L.

Cylindrosporium glycyrrhizae Harkn., leaf spot. Calif.
Erysiphe polygoni DC., powdery mildew. N.Mex., N.Dak.
Microsphaera diffusa Cke. & Pk., powdery mildew. Colo., Mont., Wash., Wyo.
Septoria glycyrrhizae Ell. & Kell., leaf spot. Kans., Wash.
Uromyces glycyrrhizae (Rab.) Magn. (O,I,II,III), rust. N.Dak. to Tex., Calif., and Wash.; also on *G. glutinosa* Nutt., Calif.

Gymnocladus

G. dioica (L.) K.Koch, Kentucky coffeetree.

Tall tree with rough bark, stout branchlets, and coarse pods; frequently planted for ornamental purposes where sturdy aspect is desired. Range 19,21,22,23,24,25,27.

Amerosporium subclausum Ell. & Kell., on fallen leaves. Kans.
Cercospora gymnocladi Ell. & Kell., leaf spot. North Central States.
Gloeodes pomigena (Schw.) Colby, on branches. Ind.
Marssonina sp., leaf spot. Nebr.
Phyllosticta gymnocladi Tehon & Daniels, leaf spot. Ill.
Phymatotrichum omnivorum (Shear) Dug., root rot. Okla., Tex.
Polyporus pulchellus Schw., wood rot. Ind., Mich.

Hardenbergia

Hardenbergia spp. (*Kennedia*)

Ornamental woody vines of Australia; handsome flowers; grown in southern California and under glass.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.

Hedysarum, sweetvetch

Hedysarum spp.

Low perennial herbs of light open ground in the North and at high altitudes in the West; sometimes grown for ornament. *H. boreale* Nutt. is circumpolar; *H. coronarium* L. is introduced from Europe.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematode. On *H. coronarium.*
Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. N.Y.
Septogloeum hedysari Solh., leaf spot. Wyo. (on *H. marginatum* Greene).

Uromyces hedysari-obscuri (DC.) Car. & Piccone (O, I, II, III), rust. Alaska, Colo., Idaho, Mont., N. Mex., S. Dak., Utah, Wyo. (on *H. boreale* and other species).

Hoffmansegia

H. oxycarpa Benth.
Dryland shrub of the Southwest.

Ravenelia hoffmanseggiae Long (II), rust. Tex.

Hymenaea

H. courbaril L., West Indian locust.
Forest tree of tropical America.

Irenina hymenaeicola (Gonz. Frag. & Cif.) F. L. Stevens, black mildew. P.R.
Uredo hymenaeae Mayor (II), rust. P.R.

Indigofera, indigo

Indigofera spp.
Shrubs or perennial herbs, mostly Asiatic, some from tropical America, grown for ornament, or once cultivated for indigo (especially *I. suffruticosa* Mill.) and subsequently naturalized locally in the South.

Nectria cinnabarina Tode ex Fr., on stems. Md.
Parodiella perisporioides (Berk. & Curt.) Speg., on leaves. N. Mex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Ravenelia indigoferae Tranz. (II, III), rust. P.R.
R. laevis Diet. & Holw.—Tex.
Uromyces indigoferae Diet. & Holw. (II, III), rust. Fla., Tex.

Inga

Inga spp., especially *I. laurina* (Sw.) Willd., guama, and *I. vera* Willd., guama, or guaba.
Trees or shrubs of tropical America, having acacia-like foliage and clustered, showy red stamens; used for hedges and shade in coffee plantations.

Bitzea ingae (Syd.) Mains (O, II, III), rust. P.R.
Catacauma ingae Chardon, black mildew. P.R.
Cephaleuros virescens Kunze, green scurf. P.R.
Diatractium ingae (Rehm) Syd.—C.Z., P.R.
Irenopsis toruloidea F. L. Stevens, black mildew. P.R.
Melasmia ingae F. L. Stevens, on leaves. P.R.
Meliola chagres F. L. Stevens, black mildew. C.Z.
Microstroma ingaicola Lamkey, witches'-broom. P.R.
Microthyrium ingae (Ryan) Toro, on leaves. P.R.
Mycosphaerella maculiformis (Pers. ex Fr.) Schroet., on fallen leaves. P.R.
Omphalia flavida (Cke.) Maubl. & Rangel, leaf spot. P.R.
Paradiopsis ingarum (P. Henn.) Arn., black mildew. C.Z.
P. stevensii Arn.—P.R.
Perisporina truncatum (F. L. Stevens) Arn., black mildew. P.R.
Phyllachora amphibola Syd., on leaves. P.R.
Ravenelia ingae (P. Henn.) Arth. (=*Uredo ingae* P. Henn.) (II), rust. P.R.
Rosellinia bunodes Berk. & Br., root rot. P.R.
Scolecodothopsis ingae F. L. Stevens, black spot. C.Z.
Scolecopeltis ingae Toro, black spot. P.R.
Septoideum stevensii Arn., on leaves. P.R.

Krameria

K. lanceolata Torr.
Perennial herb (woody at base) of American prairie.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Uromyces krameriae Long (III), rust. Tex.

Laburnum

L. anagyroides Med. (*L. vulgare* Bercht. & Prsl., *Cytisus laburnum* L.), goldenchain, beantree.
Large flowering shrub or tree of southern Europe, cultivated in various forms, zone 5.

Botryosphaeria ribis Gross. & Dug., on branches. Md.
Camarosporium laburni (West.) Sacc.: See *Cucurbitaria laburni*.
Cercospora laburni Ray, leaf spot. Okla.
Cucurbitaria laburni (Pers. ex Fr.) de N., on branches. Ohio, N.Y.
Diaporthe medusaea Nits. (*D. rudis* (Fr.) Nits.), on branches. Mass. to N.J. and Ohio; Calif.
Fusarium sp., twig blight. Md., Ohio.
F. lateritium Nees, twig blight. N.J. (conidial stage of *Gibberella baccata* (Wallr.) Sacc.).
Nectria cinnabarina Tode ex Fr., on branches. Ohio.
Phomopsis rudis (Fr.) Hoehn.: See *Diaporthe medusaea*.
Rabenhorstia rudis Fr., on branches. Md., Pa.
Rhabdospora rudis (Karst.) Sacc., on branches. Ohio.

Lathyrus

I. Introduced and Naturalized Species From Europe

(1) *Lathyrus hirsutus* L., rough peavine.
(2) *L. latifolius* L., perennial (everlasting) pea.
(3) *L. odoratus* L., sweetpea.
Biennial (1), climbing perennial (2), and annual (3) herbs or shrubby plants of southern Europe: (1) grown as a cover crop in sugarcane fields in the South; (2,3) grown for ornament; (3) important florists' crop and widely grown in home gardens, especially in the North and Far West.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Md., N.J., Va. (3). Probably in part confused with fasciation; for which see *Corynebacterium fascians*. In Canada fasciation is said to be caused by a strain of *A. tumefaciens*.
Alternaria sp. (*?A. tenuis* Nees ex Wallr.), secondary leaf spot. Mass., Md., N.J., N.Y., Pa., Tex. (3)
Aphanomyces euteiches Drechs., root rot. Wis. (2); Ind., Mich., Wis. (3).
Ascochyta sp., leaf and stem spot. La. (1).
Ascochyta sp. (*?A. lathyri* Trail), stem spot. Conn., Minn., Mo., W. Va., Wis. Root rot—Kans. (3).
A. lathyri Trail, stem spot. N.J. (2).
Bacillus lathyri Manns & Taub., bacterial streak. Del., Ga., Mass., N.J., N. Mex., N.Y., Okla., Pa., Tex., Wash. Possibly a complex disease involving virus streak (3). Pathogenicity doubted.
Botrytis cinerea Pers. ex Fr., gray mold, blossom and shoot blight. Alaska, Minn., Pa., Wash., probably general (3).
Cercospora lathyrina Ell. & Ev., leaf spot. Ga., Okla. (2).

Cladosporium album Dows.: SEE *Erostrotheca multiformis.*

Colletotrichum pisi Patterson, leaf spot. Ala., Fla., Ga., S.C. (3).

Corynebacterium fascians (Tilford) Dows., fasciation. Calif., Colo., Conn., Ga., Ind., Iowa, Md., Mich., Mo., N.J., N.Y., Ohio, Okla., Pa. (3).

Cuscuta indecora Choisy, dodder. Tex. (3).

Erostrotheca multiformis G. H. Martin & Charles (*Cladosporium album* Dows. as identified in the U.S.), white mold. Calif., Wash. (2); Mass., N.J., N.Y., Pa., Tex. (3). Observed only on greenhouse crops.

Erysiphe polygoni DC., powdery mildew. Frequently reported, especially on greenhouse crops but sometimes confused with *Microsphaera alni* (3).

Fusarium spp., stem and root rot, wilt. Occasional to prevalent on greenhouse crops, sometimes also in the open. Commonly ascribed to *F. lathyri* Taub. (=*F. solani* (Mart.) Appel & Wr. f. *pisi* (F.R. Jones) Snyd. & Hans., also known as *F. solani* var. *martii* (Appel & Wr.) Wr. f. 2 Snyder), and reported in Colo., Fla., Ind., Miss., N.Dak., N.Y., Ohio, Tex. *F. oxysporum* Schlecht. f. *vasinfectum* (Atk.) Snyd. & Hans. is reported as the cause of wilt in Fla. and N.Y. (3).

Gloeosporium sp., (*G. rufomaculans* (Berk.) Thuem.): SEE *Glomerella cingulata.*

Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, blossom and shoot blight. General except the Pacific coast (3).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Isariopsis griseola Sacc., leaf spot. Conn. (3).

Meloidogyne spp., root knot nematodes. ?Fla. (2); Mass., N.J., N.Y., Tex. (3).

Microsphaera alni DC. ex Wint., powdery mildew. General, especially on greenhouse crops. Fla. (3).

Mycosphaerella sp., stem spot, blight. Ala. (1).

Mycosphaerella sp. (?*M. ontarioensis* Stone), on leaves. N.J. (2).

M. pinodes (Berk. & Blox.) Vest., stem and leaf spot. Mont. (2); Wis. (3).

Ovularia sp., leaf spot. Calif. (2).

Peronospora trifoliorum d By, downy mildew. Fla. (3).

Phyllosticta orobella Sacc., on leaves (leaf spot). Tex. (2,3).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).

Phytophthora cactorum (Leb. & Cohn) Schroet., root rot. Conn. (3).

Pratylenchus pratensis (De Man) Filip., root lesion nematode associated with root blackening. N.J., N.Y. (3).

Pseudomonas pisi Sackett, bacterial leaf spot. Ind., Wis. (3).

Pythium spp., root rot, damping-off. Calif., Conn., Md., N.J.

P. debaryanum Hesse—identified in Conn, N.J., and N.C.; *P. ultimum* Trow—in Mass. (3).

P. oligandrum Drechs., root rot. N.Y. (3).

Ramularia sp., leaf spot. N.Y. (3).

R. deusta (Fckl.) K.F.Baker, Snyder, & L.H.Davis f. *odorati* K.F.Baker, Snyd. & L.H.Davis, Ramularia leaf spot. Calif. Also reported under other names in Mass., N.J., N.Y., Pa., Tex., and Wash. (3).

Rhizoctonia solani Kuehn, damping-off, root and stem rot. General (3).

Sclerotinia sp. (?*S. sclerotiorum* (Lib.) d By.), stem rot, wilt. Md., Pa. (3).

Sclerotium rolfsii Sacc., southern blight. Fla., Tex. (3).

Septoria lathyri Ell. & Ev., on leaves. N.J. (2).

Thielaviopsis basicola (Berk. & Br.) Ferr., black root rot. Conn. to Ohio, Ill., and Minn., also Fla., Colo., and Pacific coast (3).

Verticillium sp. (*V. albo-atrum* Reinke & Berth.), wilt. N.J., N.Y. (3).

MOSAIC—various viruses. General. Infection, either natural or from artificial inoculation with the following viruses, has been reported: *Marmor leguminosarum* Holmes (Pisum virus 2 K.M.Sm.); *M. pisi* Holmes (Pisum virus 1 K.M.Sm.); yellow bean mosaic virus (Phaseolus virus 2 K.M.Sm.); *Marmor efficiens* F. Johnson; *M. repens* F. Johnson; and *M. trifolii* Holmes. Flower breaking (striping) is commonly caused by common pea mosaic virus *(M. leguminosarum)* (3).

SPOTTED WILT—virus (*Lethum australiense* Holmes (Lycopersicon virus 3 K.M.Sm.). Calif. (3).

STREAK—suspected virus or virus complex, the components not identified; perhaps also in part bacterial (see *Bacillus lathyri).* Eastern States, Tex. Susceptibility of sweetpea, with necrotic reactions, has been demonstrated to the following viruses: *Marmor cucumeris* Holmes (Cucumis virus 1 K.M. Sm.); *M. lactucae* Holmes (Lactuca virus 1 K.M. Sm.): *M. medicaginis* Holmes (Medicago virus 1 K.M.Sm.); and *M. annularium* McK. (Nicotiana virus 12 K.M.Sm.) (3).

BUD DROP—physiological, usually ascribed to unbalanced nutrition (deficiency of phosphorus and potassium), augmented by low light intensity. Occasional in greenhouse crops (3).

II. Native Perennial Species, Peavine or Vetchling

(1) *Lathyrus japonicus* Willd., seaside pea or beach peavine.

(2) *L. ornatus* Nutt.

(3) *L. palustris* L., marsh peavine, wing-stemmed wild peavine, and a few other species of value to wildlife.

(4) Species not determined or not designated.

Native perennials, decumbent to climbing: (1,2) sometimes grown for ornament in wild gardens; (3) of value to wildlife.

Alternaria tenuis Nees ex Wallr., secondary leaf spot. Vt. (3).

Ascochyta lathyri Trail, stem and pod spot. Wash. (1).

A. pisi Lib., leaf spot. Calif., Wis. (3); Okla. (4).

Cercospora lathyri Dearn. & House, leaf spot. Mass., N.Y. (1).

C. viciae Ell. & Holw.—Wis. (3).

Erysiphe polygoni DC., powdery mildew. Alaska (1, 3); Wash. (1).

Gloeosporium davisii Ell. & Ev., leaf spot. On *L. venosus* Muhl., Iowa.

Heterosporium sp., leaf spot. Okla. (4).

Microsphaera alni DC. ex Wint., powdery mildew. Ill., Iowa, Mich., N.Y., Ohio, Wis. (3).

Mycosphaerella pinodes (Berk. & Blox.) Vest., basal stem rot. On *L. tingitanus* L., Miss.

Phleospora reticulata Ell. & Ev., leaf spot. Maine (1).

Phyllosticta orobella Sacc., leaf spot. Mass., N.Y. (1).

P. suecica Bub. & Vleug.—Conn. (1).

Ramularia roseola Bub. & Vleug. (=*R. deusta* f. *latifolii* K.F.Baker, Snyd. & L.H. Davis), leaf spot. Alaska (3).

Rhizoctonia solani Kuehn, root rot. Tex. (4).

Sclerotium rolfsii Sacc., southern blight. Tex. (4).

Septoria astragali Rob. ex Desm., leaf spot. Mass., Vt. (1).

S. emaculata Berk. & Curt., leaf spot. N.Y., Wis. (3).

Uromyces fabae (Pers.) d By. (O,I,II,III), rust. On (2), (3), and (4) throughout their range.

Urophlyctis lathyri Palm, stem and leaf gall. On *L. sulphureus* Brewer, Oreg.

Lens

L. culinaris Medik., lentil.

European annual, grown there for edible seeds; rarely cultivated in America.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes.

Lespedeza, bushclover

I. Endemic Species

(1) *Lespedeza capitata* Michx.
(2) *L. hirta* (L.) Hornem.
(3) *L. repens* (L.) Bart.
(4) *L. stuevei* Nutt.
(5) *L. violacea* (L.) Pers.
(6) *L. virginica* (L.) Britt.
(7) Species not determined or not designated.

Perennial herbs of prairies and open woods from the Atlantic and Gulf coasts to Minnesota and Texas; useful as ground cover and as food for wildlife.

Cercospora flagellifera Atk.—Wis. (1); Ala., Tex.
C. latens Ell. & Ev., leaf spot. Kans. (1), Tex.
C. lespedezae Ell. & Dearn., leaf spot. Ill., N.Y. (2); Wis. (1,5).
Cuscuta spp., especially *C. arvensis* Beyrich and *C. pentagona* Engelm., dodder. Occasional, Pa. to Ala. and Tex.
Diaporthe arctii (Lasch) Nits., on stems. Va. (6).
Didymella sp., on stems. On *L. frutescens* (L.) Britt., Ga.
Microsphaera diffusa Cke. & Pk., powdery mildew. Conn., Ill., Minn., N.Y. (1); Ill., Pa. (2); Mass., Miss., Va., W.Va. (7).
Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. Kans., Mo., S.C. (7).
Phyllachora lespedezae (Schw.) Sacc., tar spot. On all species named, more or less general throughout their range.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on stems. Ga. (6).
Sclerotium rolfsii Sacc., root and stem rot. On *L. simulata* Mack & Bush, Fla.
Uromyces lespedezae-procumbentis (Schw.) Curt. (O,I, II,III), rust. General (*).
FASCIATION — *?Corynebacterium fascians* (Tilford) Dows. Va. (2).

II. Introduced Species

(1) *Lespedeza cuneata* (Dumont) G.Don (*L. sericea* Miq.), Chinese lespedeza.
(2) *L. stipulacea* Maxim., Korean clover.
(3) *L. striata* (Thunb.) H. & A., common lespedeza (Japanese clover).
(4) Species not determined or not designated.

Perennial (1) or annuals (2,3), of eastern Asia, grown as forage and cover crops in the Southeastern and South Central States; (3) is also naturalized in fields and waste ground from Pennsylvania to Florida, Texas, and Kansas.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn., crown gall. Okla. (4).
Alternaria sp., leaf spot (?secondary). Del., Md. (1).
Catosphaeropsis caulivora Tehon, stem canker, blight. Ill. (2).
Cercospora lespedezae Ell. & Dearn., leaf spot. Ill. (2).
Colletotrichum sp., leaf and stem spot. N.C., S.C. (1,2).
C. trifolii Bain & Essary, southern anthracnose. Ill. (2).
?Coniothyrium sp., on stems. Md. (1).
Corticium stevensii Burt: SEE *Pellicularia koleroga*.
Cuscuta sp. (especially *C. arvensis* Beyrich), dodder. Frequent throughout the range of cultivation.
?Didymosphaeria brunneola Niessl, on stems. Md. (1).
Erysiphe polygoni DC., powdery mildew. S.Dak., Va. (3).
Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf spot. Ga., N.C., S.C., Va. (2,3). Weimer calls this anthracnose, due to a specialized race, especially on (3); (2) is resistant.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Kabatiella caulivora (Kirch.) Karak., stem canker. Ill. (2).
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot, stem canker. Ga., Ill. (2); Tex. (1).
Meloidogyne spp., root knot nematodes. Ga., Md. (1); Ga. (2); Ala. (3).
Microsphaera diffusa Cke. & Pk., powdery mildew. Fla., Ill. (2) based on conidia only; Ala., Fla., Ga., Ill., Miss., S.C., Va. (3).
Mycosphaerella sp., blight, stem necrosis. Ala.
Pellicularia koleroga Cke. (*?Corticium stevensii* Burt), brown leaf patch. N.C. (2).
Pseudoplea briosiana (Poll.) Hoehn. (*Pleosphaerulina briosiana* Poll.), leaf spot. Ga. (1).
Rhizoctonia sp. (*?solani* Kuehn), damping-off, root rot. Ga.
Sclerotium bataticola Taub.: SEE *Macrophomina phaseoli*.
S. rolfsii Sacc., southern blight. Ark. (2), N.C. (2,3), Tex. (2). Probably general in the Southeastern States.
Stemphylium sp., leaf spot. Md. (4).
Xanthomonas lespedezae (Ayers et al.) Starr, bacterial wilt. Ga., Ill., Kans., Mo., N.Y. (2); Tenn., Va. (2,3). Probably general throughout the range of cultivation of the annual lespedezas; infectious experimentally to (1) and several species of endemic lespedezas.

Leucaena

Leucaena spp., especially *L. glauca* (L.) Benth., leadtree.

A small tree of tropical America and Pacific Islands, cultivated for ornament and locally naturalized in Florida; also *L. greggii* Wats. and *L. pulverulenta* (Schlecht.) Benth. occurring in southwestern Texas.

Botryosphaeria ribis Gross. & Dug. var. *chromogena* Shear, N.E.Stevens, & M.S.Wilcox, on branches. T.H.
Exosporium leucaenae F.L.Stevens & Dalby, leaf spot. P.R.
Ganoderma sulcatum Murr., root rot. Tex. (On *L. pulverulenta*).
Physalospora obtusa (Schw.) Cke., on branches. T.H.
Ravenelia leucaenae Long (II,III), rust. Tex. (on *L. pulverulenta*).

Lonchocarpus

Lonchocarpus spp.

Tropical trees or climbing shrubs, sometimes grown for ornament.

Atelocanda incrustans Arth. & Cumm.—C.Z.
Meliola bicornis Wint. and *M. lonchocarpicola* F.L. Stevens, black mildew. C.Z., P.R.

Lotus, birdsfoot-trefoil

(1) *L. corniculatus* L.

Perennial herb of Europe, established on waste ground near the Atlantic coast and inland; furnishes food for wildlife.

(2) *L. purshianus* (Benth.) Clements & Clements, prairie-trefoil, deervetch. (*Hosackia* Piper).

Annual of dry fields and plains from Minnesota to Arkansas, California, and Washington; furnishes food for wildlife.

(3) Species not determined or not designated.

Alternaria sp., secondary leaf spot. Va. (1).
Colletotrichum truncatum (Schw.) Andrus & W.D. Moore—La.
Erysiphe polygoni DC., powdery mildew. Calif., Minn., Oreg., S.Dak., Wash. (2); also on other native species in this range.
Fusarium sp., wilt. N.Y. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Ala., Calif., ?Fla. (1).
Mycosphaerella sp. (*Sphaerella hosackiae* Cke. & Harkn.), on stems. On *L. scoparius* (Nutt.) Ottley, Calif.
Ovularia lotophaga Ell. & Ev., leaf spot. N.Dak. (2); Calif., Oreg. (3).
Peronospora lotorum Syd. (*?P. trifoliorum* d By.), downy mildew. Oreg. (1).
Phoma hosackiae Cke. & Harkn., on stems. On *L. scoparius*, Calif.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Pleospora leguminum (Wallr.) Rab. (*?P. herbarum* (Pers. ex Fr.) Rab.), on stems. Calif. (2).
Pyrenopeziza compressula Rehm, on stems. On *L. stipularis* (Benth.) Greene, Calif.
Ramularia schulzeri Baeumler, on leaves. Nebr., Tex. (2).
Rhizoctonia solani Kuehn, brown patch. Md.
Sclerotinia sp., wilt. Wash (3).
S. sclerotiorum (Lib.) d By.—N.Y. (1).
Septoria hosackiae Harkn., leaf spot. On *L. strigosus* (Nutt.) Greene, Calif.
Synchytrium sp., leaf gall. ?Calif.
Thecaphora deformans Dur. & Mont., seed smut. On *L. humistratus* Greene, Ariz.; on *L. micranthus* Benth., Wash.
Uromyces striatus Schroet. var. *loti* (Blytt.) Arth. (II, III), rust. Calif. (3). O and I on *Euphorbia* spp. in Europe.
Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.) Calif. (3).

Lupinus, lupine

I. Fruticose or Arborescent Species

Several species of evergreen shrubs or small trees, such as *Lupinus albifrons* Benth., *L. arboreus* Sims, tree lupine, *L. chamissonis* Esch., and *L. densiflorus* Benth. in range 1,4,5,10; useful chiefly in soil conservation.

Armillaria mellea Vahl ex Fr., root rot. Calif.
Collybia velutipes Curt. ex Fr., wound rot. Calif.
Cryptosporium (*?Phomopsis*) *lupini* Cke., on stems. Calif.
Diaporthe lupini Harkn., on stems. Calif.
Didymella lupini (Cke. & Harkn.) Berl. & Vogl., on stems. Calif.
Diplodia lupini Cke. & Harkn., on stems. Calif. (?Conidial stage of *Physalospora mutila* (Fr.) N.E. Stevens).
Epicoccum purpurascens Ehr.—Alaska, (on *Lupinus* sp.).
?Erysiphe polygoni DC., powdery mildew. Widespread.
?Fusarium sp., wilt. Calif., T.H.
Hadrotrichum globiferum (Ell. & Ev.) J.J.Davis (*Ovularia globifera* Ell. & Ev.), on leaves. Calif.
Hendersonia lupini Cke. & Harkn., on stems. Calif.
?Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Macrophoma lupini (Cke. & Harkn.) Berl. & Vogl., on stems. Calif.
?Meloidogyne spp., root knot nematodes. Occasional.
Nectria eucalypti (Cke. & Harkn.) Sacc. (*?N. depallens* Cke. & Harkn.) and *N. sanguinea* Bolt. ex Fr., on stems. Calif.
Phyllosticta ferax Ell. & Ev., leaf spot. Calif.
Pleospora balsamorhizae Tracy & Earle. Calif. (On *L. albicaulis* Dougl.).
P. leguminum (Wallr.) Rab., on pods. Calif.
Pleurotus ostreatus Jacq. ex. Fr., wound rot. Calif.
?Pratylenchus pratensis (De Man) Filip., root lesion nematode. Calif.
?Pythium sp., damping-off. Calif.
Septoria lupini Harkn.—Calif. (on *L. densiflorus*).
Sphaeropsis lupini Cke. & Harkn., on stems. Calif. ?Conidial stage of *Physalospora mutila* (Fr.) N.E.Stevens.
Uromyces lupini Berk. & Curt. (O,I,II,III), rust. Calif.
U. occidentalis Diet. (*U. substriatus* Syd.) (II,III), rust. Mont. to Colo., Calif., and Oreg.
Valsa lupini Cke. & Harkn., on stems. Calif.

II. Herbaceous Species

Annual or perennial herbs, native in various parts of the United States, especially the Rocky Mountain and Pacific Coast States. Exotic species cultivated most commonly for soil improvement, forage, and ornament are annuals, such as *Lupinus albus* L., white lupine; *L. angustifolius* L.; *L. luteus* L., yellow lupine, *L. hirsutus* L., blue lupine; and *L. pubescens* Benth. (*L. hybridus* Voss). See also section IV.

Aecidium lupini Pk. and *A. onobrychidis* Burr.: See *Puccinia andropogonis* var. *onobrychidis*.
Alternaria sp., leaf spot. Mass.
Ascochyta sp.: See *Mycosphaerella pinodes*.
Botrytis cinerea Pers. ex Fr., wilt. Ala., Alaska, Mass., Mont.
Cercospora longispora Pk. (*C. filispora* Pk.), leaf spot. Mo., N.Y., Wis.
C. lupini Cke., leaf spot. Fla., S.C., ?Oreg. (on *L. diffusus* Nutt.).
C. lupinicola Lieneman (*C. texensis* Tharp)—Tex.
Colletotrichum sp.—Md.
Comandra pallida A.DC., on roots. Wash.
Cylindrosporium sp.—Wyo.
C. lupini Ell. & Ev., on leaves. Calif.
Diaporthe lupini Harkn., on stems. Calif.
Erysiphe polygoni DC., powdery mildew. Widespread. On numerous species.
Fusarium spp., wilt., stem rot, seedling blight. N.J. to Fla. and La.; Calif., T.H.
Hadrotrichum globiferum (Ell. & Ev.) J. J. Davis (*Ovularia globifera* Ell. & Ev.), on leaves. Calif., Colo., Idaho, Wash., Wyo.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Macrophomina phaseoli (Maubl.) Ashby, root rot. Calif. (on *L. mutabilis* Sweet.).
Meloidogyne spp., root knot nematodes. Widespread.

Mycosphaerella pinodes (Berk. & Blox.) Stone, leaf spot. Conn., ?Iowa, Wis.
Peronospora trifoliorum d By., downy mildew. Wis.
Phoma lupini Ell. & Ev., on leaves. Colo., N.Mex., Pacific Coast States.
Phyllosticta ferax Ell. & Ev., leaf spot. Calif. to Wash. and Wyo.
P. lupini Bonar—Calif. (On *L. micranthus* Dougl. and *L. nanus* Dougl.)
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia andropogonis Schw. var. *onobrychidis* (Burr.) Arth. (O,I,), rust. Mich., N.Y., Wis. to Colo., and Wyo. II and III on *Andropogon* spp.
Pythium debaryanum Hesse, damping-off. Tex.
Ramularia lupini J.J.Davis, leaf spot. Tex.
Rhizoctonia solani Kuehn, stem rot. Occasional.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. N.Y.
Sclerotium rolfsii Sacc., southern blight. Ga., Tex.
Septogloeum lupini Ell. & Ev., on leaves. Mich.
Septoria lupini Harkn., on leaves. Calif.
S. lupinicola Dearn.—Wis., Wyo.
Sorosporium astragali Pk. (=*Thecaphora deformans* Dur. & Mont.), smut. Colo., Wyo.
Uromyces lupini Berk. & Curt. (O,I,II,III), rust. Rocky Mountain and Pacific Coast States.
U. occidentalis Diet. (II,III), rust. Rocky Mountain and Pacific Coast States.

III. Ornamental Species

(1) *Lupinus perennis* L., sundial lupine.
(2) *L. polyphyllus* Lindl., Washington lupine.
(3) *L. subcarnosus* Hook., Texas lupine, bluebonnet.
(4) Species not determined or not designated.

Native species (among others) cultivated for ornament. The garden lupines are derived mostly from introduced species such as *L. hartwegii* Lindl., *L. hirsutus* L., *L. pubescens* Benth., and others; host identification is usually lacking in records pertaining to these species. Various native species are sometimes grown in wild gardens.

Alternaria sp., leaf spot. Mass. (2).
Ascochyta sp. (chiefly *A. pisi* Lib.), blight, stem necrosis. Wis. (1); Conn. (4).
Botrytis cinerea Pers. ex Fr., gray-mold blight. Mass. (2); Mont., N.Y. (4).
Cercospora longispora Pk., leaf spot. N.Y., Tex., Wis. (1); Fla. (4).
C. lupini Cke., leaf spot. Oreg. (2); Fla., S.C. (4).
C. lupinicola Lieneman (*C. texensis* Tharp), leaf spot. Tex. (3).
Colletotrichum spp., stem spot. Md. (4).
Cryptosporium lupini Cke., on stems. Calif. (4).
Cylindrosporium lupini Ell. & Ev., leaf spot. Calif. (4).
?Diaporthe lupini Harkn. Calif.
Erysiphe polygoni DC., powdery mildew. Mass. to Md., Ill., and Wis. (1); Oreg. (2); Tex. (3). Widespread on native species in the West.
Fusarium sp., root rot. N.J., Va. (4).
Gloeosporium lupinicola Dearn., leaf spot. Tex. (3).
Hadrotrichum globiferum (Ell. & Ev.) J.J.Davis, leaf blight. Calif., Colo., Oreg., Wash., Wyo. (4)
Hendersonia lupini Cke. & Harkn., on stems. Calif. (4).
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. On *L. mutabilis* Sweet—Calif.
Microsphaera sp., powdery mildew. N.J. (4).
Ovularia sp., leaf spot. Wash.
O. lupinicola Pollack, leaf spot. Wash. (1), Colo. (4).
Peronospora trifoliorum d By., downy mildew. Wis. (1).
Phoma lupini Ell. & Ev., leaf and stem spot. On various native species, Colo. to N.Mex., Calif., and Wash.
P. lupinicola Tracy & Earle, on stems. Colo. (4).
Phyllosticta ferax Ell. & Ev., leaf spot. On various native species, S.Dak. to Colo., Calif., and Wash.
P. lupini Bonar, leaf spot. Calif. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,3).
Pratylenchus pratensis (De Man) Filip., root lesion nematode. Calif. (4).
Puccinia andropogonis Schw. var. *onobrychidis* (Burr.) Arth. (O,I), rust. Mich., Minn., N.Y., Wis. (1). II and III on *Andropogon* spp.
Pyrenophora chrysospora (Niessl) Sacc., on stems. Colo. (4).
Pythium debaryanum Hesse, stem rot. Tex. (3); Calif. (4).
P. ultimum Trow, root rot. Calif. (4).
Ramularia lupini J.J.Davis, on leaves. Tex., Wash.
Rhizoctonia solani Kuehn, damping-off, root and stem rot. Conn. (1), Tex. (3).
Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. N.Y., Tex. (1); La. (4).
Sclerotium rolfsii Sacc., stem rot, southern blight. Tex. (1,3); Southern States, Kans. (4).
Septogloeum lupini Ell. & Ev., leaf spot. Mich. (1); Calif., Alaska (4).
Septoria lupinicola Ell. & Dearn., leaf spot. Wis. (1).
Stictochorella lupini Syd., leaf spot. Calif., Wash., Alaska (4).
Thecaphora deformans Dur. & Mont., seed smut. Colo., Wyo. (4).
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. ?Iowa, Wis. (4).
Uromyces lupini Berk. & Curt. (O,I,II,III), rust. Calif., Oreg., Wash. (2); on various native species from Nebr. to Calif., Wash., and Mont.
U. occidentalis Diet. (II,III), rust. On various native species from Mont. to N.Mex., Calif., and Wash. O and I on *Euphorbia* spp.
MOSAIC—unidentified virus. T.H. (4)
RING SPOT—unidentified virus. Wash. (4).
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.) Tex. (3).
BLACK PATCH—sterile fungus. Ga. (2).

IV. Soil-Improvement Species

(1) *Lupinus albus* L., white lupine.
(2) *L. angustifolius* L., European blue lupine.
(3) *L. benthamii* Heller, Bentham's annual lupine.
(4) *L. luteus* L., European yellow lupine.

Annuals, long cultivated in Europe for edible seeds, forage, and soil renovation, less cultivated in the United States, partly because they may contain poisonous alkaloids (now eliminated in some varieties), but (2) used as a cover crop in the Southeastern States.

Alternaria sp., on stem lesions (?secondary). Ala., Ga.
Botrytis cinerea Pers. ex Fr., gray-mold blight. Ala., Fla., Ga. Chiefly on (4); associated with low temperature injury.
Ceratophorum setosum Kirchn., brown spot. La. (1); Fla. (1,4); Ala., Fla., Ga. (2).
Colletotrichum sp. (*?Glomerella cingulata*), on stems (?on leaves). Md.
Diplodia theobromae (Pat.) Nowell, stem blight. Ala. (1). Conidial stage of *Physalospora rhodina* (Berk. & Curt.) Cke.
Erysiphe sp., powdery mildew. Fla. (2).
Fusarium spp., root rot, wilt, seedling blight. Southeastern and Gulf States, Calif., T.H. The following specific identifications reported:

F. moniliforme Sheldon, root rot (?secondary), stem canker. Ala., Ga. (1,2,4).
F. oxysporum Schlecht. f. *radicis-lupini* Weimer, root rot. Ala., Fla., Ga. (1,2,4). Probably the same fungus has also been reported as *F. vasinfectum* Atk. (=*F. oxysporum* f. *vasinfectum* (Atk.) Snyd. & Hans.).
F. solani (Mart.) Appel & Wr. f. *lupini* Weimer, root rot. Fla. (2). Experimentally pathogenic to (1) and (4). May be identical with *F. solani* f. *pisi* (F.R.Jones) Snyd. & Hans., which is also pathogenic to (2) and (4).
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, leaf and pod spot. Ala., Fla., Ga. (2). Pathogenic also to (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Ala., Fla., Ga. (1,2,4); T.H. (1).
Mycosphaerella sp., stem necrosis. Ala.
Phytophthora parasitica Dast., stem rot. Fla. (1).
Puccinia lupinicola Gäum. (II,III). Calif. (3).
Pythium spp., root rot. Ala., Ga. *P. debaryanum* Hesse and *P. ultimum* Trow have been reported on *Lupinus* spp. in Calif. *P. graminicola* Subr. has been shown experimentally to be pathogenic on (1) and (4).
Rhizoctonia solani Kuehn, damping-off, secondary root rot. Ala., Fla., Ga. (1,2,4).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Fla., La. (2).
Sclerotium rolfsii Sacc., southern blight. Ala., Fla., Ga. (1,2,4).

Lysiloma

L. bahamensis Benth., Bahama lysiloma.

Small tree of Florida Keys and Bahama Islands. *L. latisiliqua* (L.) Benth. of Cuba and Lesser Antilles is sometimes cultivated for ornament.

Fomes extensus (Lév.) Cke., white pocket heart rot. Fla.
Ravenelia annulata Long and *R. lysilomae* Arth., (II, III), rust. Fla.

Maackia

M. amurensis Rupr.

Deciduous tree of Manchuria, cultivated for ornament in zone 4.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Medicago, medic

I. Annual Species

(1) *Medicago arabica* (L.) All., spotted medic.
(2) *M. hispida* Gaertn., toothed medic or burclover.
(3) *M. lupulina* L., black medic, yellow-trefoil, nonesuch.

Annual herbs of Europe established on waste ground: (1) occasional in the Middle Atlantic, Gulf, and Pacific Coast States; (2) more frequent and also found in the Central States and Southwest; (3) widely established throughout the United States except in the Far North; (2) cultivated for forage in California, (3) of some forage value in the West; (3) furnishes food for wildlife, also (2), which is sometimes a weed.

Ascochyta imperfecta Pk., black stem. ?Oreg. (3).
Botrytis cinerea Pers. ex Fr., leaf blight. Calif. (2).
Cercospora medicaginis Ell. & Ev., leaf spot. Tex. (3).
C. zebrina Pass. (*C. medicaginis* Ell. & Ev.), leaf spot. Fla. (1); Ala., Ga., La., Miss., Tex. (1,2); S.C. (2); Ind., Mass., N.Y., Tex., Wis. (3).
Colletotrichum trifolii Bain & Essary, southern anthracnose. Fla. (1); Ala., Ga., La., Miss. (1,2); Okla. (2); Ala., Tex. (3).
Erysiphe polygoni DC., powdery mildew. Calif., Miss. (2).
Gloeosporium medicaginis (Rob. & Desm.) Ell. & Kell., leaf spot. Tex. (3).
Heterodera marioni (Cornu) Goodey. SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Calif., Ga. (2). Also on *M. rigidula* (L.) Desr. in Ga. (1) is reported resistant.
Peronospora trifoliorum d By., downy mildew. Iowa (3).
Phoma sp., stem blight. Utah (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,3).
Pleospora herbarum (Pers. ex Fr.) Rab., leaf spot. Miss. (1).
Pseudopeziza medicaginis (Lib.) Sacc., leaf spot. Ga. (1); Ga., N.Y., Vt., Wis. (3).
Pseudoplea medicaginis Miles (*?P. briosiana* (Poll.) Hoehn.), leaf spot, also on other parts. Ala., Ga. (1); (2) experimentally infected; N.Y. (3). See note for *P. briosiana* under *Medicago sativa*.
Pyrenopeziza medicaginis Fckl., yellow leaf blotch. Calif. (2). See note on nomenclature of this fungus under *Medicago sativa*.
Rhizoctonia solani Kuehn, summer blight. N.C. (3).
Sclerotinia sclerotiorum (Lib.) d By., collar rot. Calif. (2).
Septoria medicaginis Rob. & Desm., stem blight. Tex. (3).
Stagonospora meliloti (Lasch) Petr., leaf spot. Fla., Ga., Miss. (1); N.Y. (3). Conidial stage of *Leptosphaeria pratensis* Sacc. & Briard.
Stemphylium botryosum Wallr., leaf spot. La. (1,2), Miss. (1). Conidial stage of *Pleospora herbarum* (Pers. ex Fr.) Rab.
Uromyces striatus Schroet. var. *medicaginis* (Pass.) Arth. (II,III), rust. Calif., La., Tex. (2); Mass. to Ala., Tex., and Okla., also Calif., Oreg. (3). O and I on *Euphorbia* spp. in Europe, not yet found in America.
Urophlyctis alfalfae (Lagh.) Magn., wart. Calif. (2).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (2).
MOSAIC—virus (white clover mosaic virus or one of its components, *Marmor efficiens* and *M. repens* F. Johnson). Idaho, N.Y. (3).
YELLOWS—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1 A K.M. Sm.). Calif. (2).
WITCHES'-BROOM — virus (*Chlorogenus medicaginis* Holmes, Medicago virus 4 K.M.Sm.), Wash. (3).
WHITE SPOT—physiological, in part caused by excessive or untimely irrigation. Utah. (3).

II. Perennial Species

(1) *Medicago falcata* L., yellow-flowered alfalfa, sickle alfalfa.

Perennial herb of Europe, cultivated for forage where hardiness is essential and used in breeding to improve this character.

(2) *M. sativa* L., alfalfa, lucerne.

Perennial, originally of trans-Caucasian and Caspian region, cultivated since antiquity for hay and forage; now grown throughout the United States as a hay and pasture crop, usually under irrigation in the West. Improved agronomic varieties involve hybridization with *M. falcata.*

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Ala., Ky., Md., Okla., Pa., Tex., Va. (2).

Alternaria sp., secondary leaf spot, seed discoloration. Del., Okla., Va. (2).

Aphanomyces euteiches Drechs., root rot. Wis. (2).

Aplanobacter insidiosum McCull.: See *Corynebacterium insidiosum.*

Armillaria mellea Vahl ex Fr., mushroom rot. Calif. (2).

Ascochyta imperfecta Pk., black stem. Kans. (1); general in the Eastern and Central States from Maine to Ky., Okla., and Minn.; occasional in the West (Calif., Idaho, Mont., N.Mex., Utah, Wash.); cause of spring black stem in Wis. (2). Sometimes causes root rot and seedling blight, also leaf spot; it is seedborne. See also *Phoma.*

A. medicaginis Bres.: See *Stagonospora meliloti.*

Botrytis cinerea Pers. ex Fr., shoot blight. Pa. (2).

Cercospora medicaginis Ell. & Ev., black leaf spot. General in the Eastern and Central States from Mass. to Wis., and Nebr., south to Ala. and Tex.; also in Calif., Utah, and P.R.; not reported in Pacific Northwest or northern Plains States (2).

Colletotrichum spp., especially *C. trifolii* Bain & Essary, southern anthracnose. N.Y. and Ill. to Ga. and Tex., also Ariz., Calif., N. Mex., and Utah. Also reported and probably not always distinguished from this species are: *C. destructivum* O'Gara and *C. graminicola* (Ces.) G.W.Wils. in Ga., Iowa, Ky., and Ohio (2).

Corticium praticola Kotila (*?Pellicularia filamentosa* (Pat.) Rogers), root rot, damping-off. Mich., Minn. (2). See also *Rhizoctonia solani.*

C. rolfsii Gurzi: See *Sclerotium rolfsii.*

Corynebacterium insidiosum (McCull.) H.L.Jens., bacterial wilt, root rot, heart rot. Kans., Wis., and also occurs in experimental plots without inoculation (1). On (2) general in northern alfalfa districts from Mass. to Ind., Colo., and Wash.; occasional in the South (Ala., Miss.); also in the Southwest (Ariz., N.Mex.), and in Calif.; reported also in Ky., N.C., and Va.

Cuscuta spp., dodder. Cosmopolitan. The species most commonly reported are: *C. arvensis* Beyrich—Mass. to S.Dak., Calif., and southward; *C. campestris* Yuncker—Calif.; *C. epithymum* Murr.—N.Y. to Ohio and Utah; *C. gronovii* Willd.—N.Y.; *C. indecora* Choisy—Ohio (2).

Cylindrocarpon ehrenbergii Wr., and *C. obtusisporum* (Cke. & Harkn.) Wr., root rot. Reported from Canada and perhaps also occurs in U.S. (2).

Ditylenchus dipsaci (Kuehn) Filip., stem nematode. Chiefly in the Western States from Nebr. to N.Mex., Calif., and Wash.; also Ga., Ill., N.C., Va. (2).

Erysiphe polygoni DC., powdery mildew. Mass., Wyo. (2).

Fusarium spp., collar rot, root rot, wilt. Central and Western States except the Pacific coast; Ga., Va. *F. oxysporum* Schlecht f. *medicaginis* (Weimer) Snyd. & Hans., reported from Ariz., Calif., Minn., Miss., and Nebr., is the typical cause of wilt. Other species reported are: *F. avenaceum* (Fr.) Sacc. in Wis.; *F. graminearum* Schwabe (=*Gibberella zeae* (Schw.) Petch) in Kans. and Wis.; *F. sambucinum* Fckl. (*?G. pulicaris* (Fr.) Sacc.). in Ohio and Wis.; and *F. solani* (Mart.) Appel & Wr. in Ky. and N.Mex. (2).

F. scirpi var. *acuminatum* (Ell. & Ev.) Wr., on stem bases. N.Dak. (2).

Gloeosporium medicaginis Ell. & Kell.: See *Stagonospora meliloti.*

G. morianum Sacc.: See *Pyrenopeziza medicaginis.*

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

Hoplolaimus coronatus Cobb, associated with root rot. Md. (2).

Leptosphaeria pratensis Sacc. & Briard (*Stagonospora meliloti* (Lasch) Petr.), leaf spot, stem canker, root rot. Calif., Kans., Md., Mo., Mont., Nev., N.Y., Okla., Pa., Utah, Va., Wis (2). Seedborne according to Canadian work (Alberta).

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. Ill., Okla. (2).

Macrosporium: See *Pleospora* and *Stemphylium.*

Meloidogyne spp., root knot nematodes. Ariz., Calif., Colo., Nebr., N.J., Okla., Tex., T.H. (2). Somewhat resistant or tolerant, especially the variety Hairy Peruvian.

Neotylenchus obesus Thorne, associated with root rot. Utah (2).

Ophiobolus tenellus (Auers.) Sacc., on stems. Va. (2).

Panagrolaimus subelongatus (Cobb) Thorne, nematode associated with bacterial wilt and collar rot. Ariz., Colo., N.J., Okla., Pa., Utah (2).

Pellicularia filamentosa (Pat.) Rogers (*Rhizoctonia solani* Kuehn), root rot, collar rot, damping-off. N.J. to Mich. and Okla., also Ariz., Calif. (2).

Peronospora trifoliorum d By. (*P. aestivalis* Syd.), downy mildew. General, especially in the Western States; Va.; New England (2).

Phoma spp., stem canker, stem cracking, black stem, leaf spot. Identified as *P. medicaginis* Malb. & Roum. (*?Pleospora rehmiani* (Staritz) Sacc.) in Colo., Idaho, Kans., Ky., Okla., Tex., Wis., and Wyo.; as *P. anceps* Sacc. in Mont.; as *P. herbarum* West. var. *medicaginis* Fckl. in Md. and N.Mex.; as *P. vulgaris* Sacc. in W.Va. By some people, the American collections are considered essentially identical with *Ascochyta imperfecta* Pk. (2).

Phyllosticta medicaginis (Fckl.) Sacc.: See *Pyrenopeziza medicaginis.*

Phymatotrichum omnivorum (Shear) Dug., root rot. Ark., Ariz., Calif., Nev., N.Mex., Okla., Tex. (2).

Physarum spp. (*P. cinereum* Batsch ex. Pers., *P. vernum* Sommerf. ex Fr.), slime-mold patch. Calif., Kans., N.Y., Pa. Occasionally smothering seedlings and small plants (2).

Placosphaeria medicaginis Tehon, leaf blotch. Ill. (2).

Pleosphaerulina briosiana Poll.: See *Pseudoplea briosiana.*

Pleosphaerulina hyalospora (Ell. & Ev.) Berl. (*Pleospora americana* Ell. & Ev.), leaf spot. N.J., W. Va. (2).

Pleospora herbarum (Pers. ex Fr.) Rab. (*Stemphylium botryosum* Wallr.), leaf spot. Maine to N.C., Tex., and S.Dak. This has been erroneously reported as *Macrosporium sarcinaeforme* Cav. (=*Stemphylium sarcinaeforme* (Cav.) Wiltshire); the alfalfa form is also physiologically different from *S. botryosum* on clover (2).

P. hyalospora Ell. & Ev.: See *Pleosphaerulina hyalospora.*

P. rehmiana (Staritz) Sacc., on stems. Idaho, Va., Reported to be the ascigerous stage of *Phoma medicaginis,* but not confirmed (2).

P. trifolii (Rostr.) Petr.: See *Pseudoplea briosiana.*

Pratylenchus pratensis (De Man) Filip., root nematode. Colo. (2).

Pseudomonas medicaginis Sackett, bacterial blight. General in the Central and Western States, including the Pacific coast; occasional in the East (Maine, Mass., Md., N.C., N.H., Pa., Vt.) (2).

Pseudopeziza jonesii Nannf.: See *Pyrenopeziza medicaginis.*

Pseudopeziza medicaginis (Lib.) Sacc., leaf spot. Kans., Wis., and occurs in experimental plots without inoculation (1); general (2).

Pseudoplea briosiana (Poll.) Hoehn. (*?P. trifolii* (Rostr.) Petr.), brown leaf spot. N.Y. to Ala., Okla., and Minn. Originally described on alfalfa as *Pleosphaerulina briosiana*, then placed in *Pseudoplea*, first as indicated above, then as *P. trifolii* (Rostr.) Petr. A further transfer to *Pleospora*, as *P. trifolii* (Rostr.) Petr. has been proposed. *Pseudoplea medicaginis* Miles, on *Medicago arabica*, also is considered identical by some workers (2).

Pyrenopeziza medicaginis Fckl., yellow leaf blotch. Mont. (1); general (2). The transfer to *Pseudopeziza* as *P. jonesii* Nannf. has been proposed but is not accepted by American specialists.

Pythium spp., ?root rot, damping-off. *P. debaryanum* Hesse identified in Calif., Iowa, Mo.; *P. mammilatum* Meurs and *P. proliferum* d By. in Calif.; *P. pulchrum* Mind. and *P. splendens* Braun in Iowa; *P. rostratum* Butl. and *P. ultimum* Trow in Calif.; sp. undetermined in Kans. and La. (2).

Rhabdospora allantoides (Berk. & Curt.) Sacc., on stems. Pa. (2).

Rhizobium meliloti Dangeard, in root nodules. General in alfalfa soils, naturally or by inoculation (2).

Rhizoctonia spp., root rot and stem canker, ?girdle. Widespread, chiefly in the Central and Western States (2). For *R. praticola* Kotila, see *Corticium praticola;* for *R. solani*, see *Pellicularia filamentosa.* Cause of "summer blight"—N.C., Va. (2).

R. crocorum DC. ex Fr., violet root rot. Widely distributed but infrequent; chiefly present in old stands, authentic records from Ariz., Iowa, Kans., Mich., Mo., Nebr., Okla., Oreg., Tex., Wash. (2).

Rosellinia necatrix (Viala) Prill., white root rot. Calif. (2).

Sclerotinia sclerotiorum (Lib.) d By., collar rot. Calif., Del., Idaho, N.Y., Wash. (2). Shown to be seed-borne in Alberta, Canada.

S. trifoliorum Eriks., root rot, collar rot. General from N.Y. to Ga. and westward to the Pacific coast; ?absent or rare in the Far South (2).

Sclerotium bataticola Taub.: See *Macrophomina phaseoli.*

Sclerotium rolfsii Sacc., root rot, southern blight. Ga., La., Miss., Tex., Va., T.H. (2).

Sporonema phacidioides Desm.: See *Pyrenopeziza medicaginis.*

Stagonospora sp., leaf spot. N.Y. to Ill., Utah, and Mont. (2). Probably mostly *S. meliloti* (Lasch) Petr. =*Leptosphaeria pratensis.* Reports of *S. carpatica* Baeumler in the U.S. appear not to have been based on critical determinations.

Stagonospora sp. (*?S. meliloti* (Lasch) Petr.), leaf spot. Wis. (1).

Stemphylium botryosum Wallr.: See *Pleospora herbarum.*

Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Mass., N.J., Tex. (2).

Tylenchus agricola De Man, associated with root rot. Wyo. (2).

T. dipsaci (Kuehn) Bast.: See *Ditylenchus dipsaci.*

Uromyces striatus Schroet. var. *medicaginis* (Pass.) Arth. (II,III), rust. S.Dak. (1); general (2). O and I on *Euphorbia* spp. in Europe.

Urophlyctis alfalfae (Lagh.) Magn., wart. Chiefly in the West (Mont. to Tex., Calif., and Wash.), especially the Pacific Coast States: occasionally in the East and South (Ala., Ind., Miss.) (2); Calif. (1).

Xanthomonas alfalfae (Riker, Jones, & Davis) Dows., bacterial leaf and stem spot. Kans., Wis. (2).

BIG BUD, PHYLLODY—?virus, possibly *Galla australiensis* Holmes (Lycopersicon virus 5 K.M.Sm.)—Idaho, Oreg., Wash. (2).

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm). Calif. (2).

DWARF—virus (*Morsus suffodiens* Holmes, Medicago virus 3 K.M.Sm.). Ariz., Calif. (2).

MOSAIC—virus (*Marmor medicaginis* Holmes var. *typicum* Black & Price, Medicago virus 1 K.M.Sm.). Chiefly in the West from Mont. to Tex., Calif., and Wash.; occasional in the Central States (Ill., Ky., Minn., Tenn., Wis.) and East (N.Y., Pa., Va.) (2).

MOSAIC—unidentified virus. N.Y. (1).

RING SPOT—virus (*Annulus tabaci* Holmes =*Marmor annularium* McK., Nicotiana virus 12 K.M.Sm.), ?natural infection. Wash. (2).

WITCHES'-BROOM—virus (*Chlorogenus medicaginis* Holmes, Medicago virus 4 K.M.Sm.)—Ariz., Idaho, Oreg., Utah, Wash. (2). [Also Alberta and British Columbia, Canada].

BLACK STEM. See *Ascochyta imperfecta* and *Phoma medicaginis.*

BLOSSOM DROP—feeding injury of plant bugs (*Lygus* spp.). Calif. (2).

GIRDLE—cause uncertain but attributed to insect injury (*Stictocephala* sp.) in the Southwest (Ariz., Calif., N.Mex.); similar, perhaps identical, disease reported in Ark., Mo., N.Y. (2).

WHITE SPOT—in part physiological, sometimes attributed to excessive or untimely irrigation, or independent of irrigation and probably caused by nutritional deficiency (?potassium or calcium); in part genetic. Chiefly in the West (Ariz., Idaho, Mont., N.Mex., Oreg., Utah, Wash.); sometimes, in old stands, in the Central and Eastern States (2).

YELLOWING—in part leafhopper injury (*Empoasca fabae* Harris), in part nutritional deficiency (potassium, boron). Eastern and Central States. Yellowing due to sulfur deficiency is also reported in Nebr. and Oreg. (2).

YELLOW TOP (bronze top)—boron deficiency. Chiefly in the West (Idaho, Wash.); occasional in the East (Ind., Ky., N.Y., N.C., Tenn.) (2).

Melilotus, sweetclover

I. Annual Species

Melilotus indica (L.) All., annual yellow sweetclover.

Annual herb of Eurasia, established in waste ground on the Atlantic and Gulf coasts and especially in the Southwest; grown as a winter cover crop in California.

Ascochyta sp. (*?Mycosphaerella lethalis*), stem rot. La.

Cercospora zebrina Pass. (*?C. davisii* Ell. & Ev.), leaf spot. Calif.

Colletotrichum trifolii Bain & Essary, anthracnose. La., Tex.

Entyloma meliloti McAlp., white smut. Ala., Ariz., Calif., La., S.C., Tex.

Erysiphe polygoni DC., powdery mildew. Calif.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Leptosphaeria pratensis Sacc. & Briard (*Stagonospora meliloti* (Lasch) Petr.), leaf and stem spot. W.Va.

Meloidogyne sp., root knot nematodes. Fla.

Mycosphaerella lethalis Stone, black stem. La.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Pythium sp., seedling blight. Iowa.

Ramularia meliloti Ell. & Ev., leaf spot. Calif.

Rhizoctonia sp. (*?solani* Kuehn), root rot. La.

Sclerotinia sclerotiorum (Lib.) d By., stem rot. Calif.

Sclerotium rolfsii Sacc., southern blight. Tex.

MOSAIC — pea enation mosaic virus (*Marmor pisi* Holmes, Pisum virus 1 K.M.Sm.). ?Calif.

MOSAIC — sugar beet mosaic virus (*Marmor betae* Holmes, Beta virus 2 K.M.Sm.). Natural infection —Calif.

MOSAIC—unidentified virus. La.

GIRDLE—cause unknown, perhaps insect injury. Ariz.

II. Biennial Species

(1) *Melilotus alba* Desr., white sweetclover.
(2) *M. alba* var. *annua* Coe, hubam sweetclover, annual form grown in the South.
(3) *M. dentata* (Waldst. & Kit.) Pers.
(4) *M. officinalis* (L.) Lam., yellow sweetclover.

Biennial herbs of Eurasia (1,2) and Europe (4), extensively naturalized in the United States and cultivated for forage, hay, and soil improvement; (1) on various soil types and in a wide range of climatic diversity; furnish food for wildlife and are important as honey plants (1,4).

Aphanomyces euteiches Drechs., seedling root rot. Wis. (1).

Ascochyta caulicola Laub. (*A. lethalis* Ell. & Barth.), stem canker, gooseneck. Ind., Iowa, Kans., Minn., Mo., N. Dak., Okla., ?Pa., Wis., ?Wash. (1); Mont., Pa., ?Okla. (4). Reported as *A. imperfecta* Pk. in Okla. (4). May actually be *A. imperfecta* Pk. as this species was isolated from (1) and (4) in Alberta and its pathogenicity proven (Phytopath. 35:840).

A. meliloti (Trel.) J.J.Davis. (=*A. lethalis* Ell. & Barth.): SEE *Mycosphaerella lethalis*. *A. meliloti* Trusova (1915) has priority.

Bacillus lathyri Manns & Taub., streak. Okla. (1). Pathogenicity doubtful.

Cercospora davisii Ell. & Ev.: SEE *Mycosphaerella davisii*.

?C. zebrina Pass., leaf spot. Calif., N.Y. (1); N.Y. (4). May be *C. davisii*, formerly considered a synonym but shown to be distinct.

Colletotrichum sp.—Iowa (1).

?C. beticola Sacc. is also reported on (1) in Iowa.

C. destructivum O'Gara, anthracnose. Iowa, Ky., Wis. (1).

C. trifolii Bain & Essary, southern anthracnose. Ill., Okla., Tex. (1); Miss., Tex. (2).

Didymella obscura Rehm, on stems. Md. (on *Melilotus* sp.).

Entyloma meliloti McAlp., white smut. La. (4).

Fusarium spp., root rot, wilt. Kans., Minn., N. Dak., N. Mex., Tenn. (1).

F. solani (Mart.) Appel & Wr. var. *aduncisporum* (Weimer & Harter) Wr. & Reinking, (=*F. solani* f. *phaseoli* (Burkh.) Snyd. & Hans.), root rot. Calif. (1).

Gloeosporium caulivorum Kirchn.: SEE *Kabatiella caulivora*.

G. meliloti Trel.: SEE *Mycosphaerella lethalis*.

G. vexans Atk., on leaves. Ala. (1).

Hendersonia sp., on dying stems. N.Y., Wis. (1).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Kabatiella caulivora (Kirchn.) Karak., northern anthracnose. Ill., Kans. (1).

Leptosphaeria sp., on dead stems. N.Y., Ohio, Wis. (1). At least 2 species may be concerned: the N.Y. collection tentatively referred to *L. viridella* (Pk.) Sacc.; the Wis. specimen perhaps genetically connected with *Stagonospora meliloti* Dearn. & House (=*Hendersonia* sp., fide F.R.Jones).

L. pratensis Sacc. & Briard (*Stagonospora meliloti* (Lasch) Petr.), leaf and stem spot, stem canker. N.Y. and Wis. to N. Mex. and Wash. (1); Mont., Wis. (4).

Meloidogyne spp., root knot nematodes. Ala., Tex., Wash. (1); Ariz. (2).

Mycosphaerella davisii F.R.Jones (*Cercospora davisii* Ell. & Ev.), leaf spot. Pa. to Ala., Kans., and Minn. (1); Iowa, Okla., Wis. (4).

M. lethalis Stone (*Ascochyta meliloti* (Trel.) J.J. Davis), black stem. N.Y. to Va., Tex., and N. Dak., ?Vt. (1); Wis. (3); Iowa, N.J., N.Y. (4).

M. linhartiana (Niessl) Petr., on stems. N.J. (1).

Peronospora trifoliorum d By., downy mildew. Wis. (1, 2); Tex. (2); Idaho, Iowa, Mont. (4).

Phoma medicaginis Malb. & Roum. (*?Pleospora rehmiana* (Staritz) Sacc.), black stem. Idaho, Okla. (4).

P. meliloti Allesch.: SEE *Leptosphaeria pratensis*.

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (1,2); Tex. (4).

Phytophthora cactorum (Leb. & Cohn) Schroet., root rot. Wis. (1); probably also in Ill., Ky., Nebr., Ohio, and S. Dak.; at first reported as *P. megasperma* Drechs., which also may be present but is doubtfully pathogenic on this host.

Pleospora kansensis Ell. & Ev., on dead stems. Kans. (1).

Pratylenchus pratensis (De Man) Filip., root nematode. U.S. (1).

?Pseudopeziza medicaginis (Lib.) Sacc., leaf spot. Ill., Miss., N. Dak., Wis., W. Va. (1). The form on *Melilotus* should probably be designated *P. meliloti* Syd. as it has been shown to be distinct pathogenically and culturally.

Pythium sp., root rot. Ill., Iowa, Ky., Ohio, Wash. (1).

P. debaryanum Hesse and *P. ultimum* Trow, damping-off. Wis. (1,4).

Ramularia sp. (*?R. meliloti* Ell. & Ev., *?Stagonospora*, *?Cercospora*), leaf spot. N.Y. (1).

Rhizobium meliloti Dangeard, in root nodules. General (1).

Rhizoctonia solani Kuehn, stem rot. Occasional from Mass. to Ala., Tex., and Wash. (1).

Sclerotinia minor Jagger, collar rot. Minn. (1).

S. sclerotiorum (Lib.) d By., stem rot. Mont. (4). ?Collar rot. Calif., Mont. (1).

S. trifoliorum Eriks., root and stem rot. Calif., Oreg., Wash., Ky., Tex., Va., W. Va. (1).

Sclerotium rolfsii Sacc., southern blight. Tex. (1).

Stagonospora meliloti (Lasch) Petr.: SEE *Leptosphaeria pratensis*. This antedates *S. meliloti* Dearn. & House (=*Hendersonia* sp., fide F.R. Jones). Reports of *S. carpatica* Baeumler in the U.S. appear to be unfounded.

Stemphylium sp. (*?S. botryosum* Wallr. (=*Pleospora herbarum* (Pers. ex Fr.) Rab.), leaf spot. Mo., ?N.Y. (1). *S. sarcinaeforme* (Cav.) Wiltshire has been reported in Wash. (1).

MOSAIC—virus. Widespread (1). Several viruses may be involved but most frequently the yellow bean mosaic virus (Phaseolus virus 2 K.M.Sm.), also reported as sweetclover mosaic virus. Other viruses infectious to but not differentiated in this host, are: *Marmor medicaginis* Holmes (Medicago virus 1 K.M.Sm.), *M. leguminosarum* Holmes (Pisum virus 2 K.M.Sm.), *M. trifolii* Holmes, *M. efficiens* F.Johnson, and *M. repens* F.Johnson.

MOSAIC—virus (commonly yellow bean mosaic virus, Phaseolus virus 2 K.M.Sm.). Md., N.Y., Va. (4).

RING SPOT—virus (?special strain of *Marmor annularium* McK., Nicotiana virus 12 K.M.Sm.). Mont., Va. (1,4).

STREAK—virus (*Annulus orae* Holmes, Nicotiana virus 8 K.M.Sm.). Ky. and probably elsewhere (1).

GIRDLE—cause unknown, attributed to insects. Ariz., N.Y. (1,4).
WHITE SPOT—physiological, attributed to excessive soil moisture or nutrient deficiency. Utah (1).

Mimosa

Mimosa spp.

Shrubs, trees, and some herbs, mostly of tropical America but several species endemic in southwestern United States; sometimes grown for ornament. Plants of other leguminous genera, such as *Acacia* and *Albizzia*, also appear in horticultural trade under this name.

Cylindrosporium sp., leaf spot. Tex.
Lipocystis caesalpiniae (Arth.) Cumm. (O,I,II,III), rust. P.R., V.I.
Meliola bicornis Wint. and *M. denticulata* Wint., black mildew. P.R.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Ramularia mimosae F.L.Stevens & Dalby, leaf spot. P.R.
Ravenelia dysocarpae Long & Goodding, (III), rust. Ariz.
R. fragrans Long (II,III), rust. Ariz., Tex.
MOSAIC—?virus. T.H. (on *M. pudica* L.).

Mucuna

(1) *M. deeringianum* (Bort) Merr., Florida velvetbean.
(2) *M. pruriens* (L.) DC., cowage velvetbean.

Coarse twining annuals: (1) of tropical Asia, (2) endemic in tropical America; grown in the Far South as forage and cover crops.

Cercospora mucunae Syd., leaf spot. P.R. (2).
C. stizolobii Syd., leaf spot. Ala., Fla., Ga., N.C., S.C. (1); P.R. (1,2)
Fusarium sp., pod spot. Tex., P.R.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Calif., Tex. In general velvetbeans are highly resistant to root knot and some varieties are apparently immune; they are commonly grown as root-knot immune crops in rotations. Slight infection of certain varieties is reported in T.H. Also reported on (2) in ?Miss.
Mycosphaerella cruenta (Sacc.) Latham (*Cercospora cruenta* Sacc.), leaf spot. Ga.
Phyllosticta mucunae Ell. & Ev., leaf spot. Ala., Tex., T.H.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Phytophthora parasitica Dast., root rot. Fla.
Pseudomonas stizolobii (Wolf) Stapp, bacterial spot. N.C. SEE ALSO *Pseudomonas syringae.*
P. syringae Van Hall, bacterial spot. Ind. (1).
Rhizoctonia solani Kuehn, stem rot. Ga., La.
Sclerotium rolfsii Sacc., southern blight. Ala., Fla., Ga., Tex.
MOSAIC—unidentified virus. Ind.
YELLOWING—zinc deficiency. Fla.

Myroxylon

Myroxlyon spp.

Trees of tropical America, grown for balsam.

Meliola xylosmae F.L.Stevens, black mildew. C.Z.
Trabutia xylosmae F.L.Stevens, black leaf spot. C.Z.

Olneya

O. tesota A.Gray, desert-ironwood.

Shrub or small tree. Range 10,11.

Phoradendron californicum (Pursh) Nutt., mistletoe. Tex. to Calif.

Ormosia, necklacetree

O. krugii Urb.

Tropical tree bearing large panicles or racemes of white, lilac, or black-purple papilionaceous flowers; brilliant seeds of some species used for beads.

Dicheirinia ormosiae (Arth.) Cumm. (II,III), rust. P.R.

Ornithopus

O. sativus Link, serradella.

European annual, grown there for forage and soil improvement, introduced for trial but scarcely cultivated in the United States.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Fla., S.C.
Rhizoctonia solani Kuehn, root and stem rot.

Oxytropis

(1) *O. lambertii* Pursh, crazyweed, white-locoweed.
(2) Other species.

Perennial herb of the western Plains: (1) a cause of livestock poisoning (locoism); (2), lacking the toxic principle, are of limited forage value.

Erysiphe polygoni DC., powdery mildew. Mont., S. Dak., Wyo. (1).
Phleospora oxytropidis Ell. & Gall., leaf spot. Mont., N. Mex. (1).
Pleospora herbarum (Pers. ex Fr.) Rab., leaf spot. Mont., Alaska (2).
Pyrenophora chrysospora (Niessl) Sacc., on dead stems. Alaska (2).
Uromyces lapponicus Lagh. (O,I,III), rust. Colo., Wyo. (2).
U. punctatus Schroet. (II,III), rust. N. Dak. and Mont. to Kans. and N. Mex. (1,2). Wis. (on *O. chartacea* Fassett). O and I on *Euphorbia* spp. in Europe.

Parkinsonia

Parkinsonia spp.

Small spiny trees of tropical America, especially *P. aculeata* L., Jerusalem-thorn, grown for hedges and locally naturalized in range 10. 11,16,17,20,30, and in Puerto Rico.

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Cylindrosporium parkinsoniae Heald, leaf spot. Tex.
?Dimerosporium parkinsoniae Heald & Wolf (=*Capnodium*), ?sooty mold. Tex.
Phoradendron californicum (Pursh) Nutt., mistletoe. Calif., Tex.
Phyllosticta parkinsoniae Ell. & Ev., leaf spot. Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.

Parosela

See *Dalea.*

Petalostemon, prairieclover

Petalostemon spp.

Annual or perennial herbs of prairies and plains in the Southern and Central States to the Rocky Mountains; of food value to wildlife and sometimes grown for ornament.

Hendersonia petalostemonis Fairm., on stems. N. Mex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia andropogonis Schw. var. *onobrychidis* (Burr.) Arth. (O,I), rust. N. Dak. to Kans., Colo., and Wyo.; Tex.
Pyrenophora comata (Auers. & Niessl) Sacc., on dead stems. N. Mex., Okla.
Uropyxis petalostemonis (Farl.) de T. (O,I,II,III), rust. Wis. to N. Dak., Colo., and N. Mex.

Phaseolus, bean

(1) *P. acutifolius* A.Gray, Texas bean.

Annual herb, native of Mexico and southwestern United States; possible erosion-control value; grown for edible seeds (especially the variety *latifolius* Freeman, tepary bean) by the aborigines.

(2) *P. adenanthus* G.F.W.Meyer

Annual vine of tropical America.

(3) *P. angularis* (Willd.) W.F.Wright, adzuki bean.

Annual of Asia, grown for edible seeds, occasionally grown in the United States to furnish sprouts.

(4) *P. aureus* Roxb., mung bean.

Annual of tropical Asia, of ancient culture, grown to a very limited extent in the United States, chiefly in the Southwest, for the seeds which are used to furnish green sprouts; grown in California, Indiana, and Oklahoma; used as green manure and for poultry feed.

(5) *P. coccineus* L., scarlet runner bean.

Perennial of tropical America, usually grown as an annual for ornament or sometimes for edible seeds.

(6) *P. limensis* Macf., lima bean, and *P. lunatus* L., Sieva, or civet bean.

P. limensis is frequently designated *P. lunatus* f. *macrocarpus* (Benth.) Van Ess., and the two types as the large-seeded and small-seeded lima beans, respectively. Since this distinction has not been consistently maintained and since some horticultural varieties are hybrids, the records for the two species are here merged. *P. limensis* is perennial, *P. lunatus* annual, but both are grown as annuals and both contain bush and vine types. They are native to tropical America; widely cultivated for green beans, especially in the Middle Atlantic, East Central, and Southeastern States; in California for dry beans.

(7) *P. mungo* L., urd, black gram, and *P. radiatus L.*

Annuals of India, grown for edible seeds which are used as sprouts; *P. mungo* used also as a hay crop.

(8) *P. vulgaris* L., kidney bean, common garden bean, haricot of the French.

Annual, probably of tropical American origin, but at present worldwide in distribution; exists in numerous horticultural types and varieties including vine (pole) and dwarf (bush) types, cultivated throughout the United States, especially for green (snap) beans in Michigan and New York; and for dry beans in California, Colorado, Idaho, Montana, New Mexico, and Wyoming.

Achromobacter lipolyticum (Huss) Bergey et al., "stickiness" of green beans. Fla. (6).
Agrobacterium tumefaciens (E.F.Sm.) & Towns.) Conn, crown gall. Occasional in experimental cultures (8).
Alternaria spp., leaf and pod spot (secondary). Ky., Md., N.J., N.Y., Pa., Va.; probably general (6). *A. brassicae* (Berk.) Sacc. f. *phaseoli* Brun. reported in Ga., Md. (6); ?Fla., Ohio (8). Most reports as *Alternaria* sp. or *A. tenuis* Auct. See next report.
Alternaria sp. (usually as *A. fasciculata* (Cke. & Ell.) L.R.Jones & Grout =*A. tenuis* Auct.), leaf spot (secondary.) Occasional in humid areas or seasons throughout the U.S., probably as a sequel to insect or spray injury or injury from other fungi (8).
Aristastoma oeconomicum (Ell. & Tracy) Tehon, leaf spot. Va. (3,7); Ga. (8).
Ascochyta boltshauseri Sacc., leaf and pod spot. Oreg. (5,8); N.C., ?Md., Pa. (6).
A. phaseolorum Sacc., leaf spot. Wash. (8).
Bacillus lathyri Manns & Taub., streak (stem and leaf spot). Del. (6,8). The specificity of this organism, its relation to the disease, and proof of pathogenicity are doubtful. SEE ALSO *Colletotrichum truncatum* and viruses.
BACTERIAL BLIGHT. SEE *Corynebacterium, Pseudomonas,* and *Xanthomonas.*
Botrytis cinerea Pers. ex Fr., gray-mold shoot blight. Occasional in cool, humid areas and seasons, chiefly northern (Maine, N.Y., Wash., Alaska), sometimes southern (Fla., La., Tex.) and western (Calif.); also cosmopolitan cause of gray-mold rot of market beans (6,8); causes pod rot — Wis. (4); Calif., Wash. (6).
?Brachysporium pisi Oud. (perhaps a *Curvularia*), leaf spot. Alaska (8).
Cephalosporium gregatum Allington & Chamberlain, brown stem rot. Ill.
Cercospora canescens Ell. & G.Martin (*?C. cruenta* Sacc. (*Mycosphaerella cruenta* (Sacc.) Latham), leaf spot, sometimes on pods. Miss., Va. (4); Southeastern States to N.Y. and Tex., P.R. (6); Ala., Fla., Kans., Mo., N.J., Tex., P.R. (8).
C. caracallae (Speg.) Greene (*Cercosporina caracallae* Speg.), leaf spot (? on leaves). Wis. (4).
C. columnaris Ell. & Ev.: SEE *Isariopsis griseola.*
C. cruenta Sacc., leaf spot. Ala. (5); Ala., Miss., S.C. (7).
C. phaseoli Dearn. & Barth., leaf spot. Mo. (8). (=*C. cruenta* according to Muller & Chupp).
C. phaseolorum Cke., leaf spot. P.R. (2), S.C. (8). (=*C. cruenta* according to Muller & Chupp).
Cladosporium herbarum Pers. ex Fr., spotting of pods

and seed. Calif., Fla., Ga., Md., N.J., Va. (6); leaf spot (?secondary)—Mont. (8).

Colletotrichum lindemuthianum (Sacc. & Magn.) Briosi & Cav., anthracnose. N.Y. (5); occasional in Eastern and Southern States from N.Y. to Fla., Tex., and Kans., P.R. (6); general in the East, reported in Tex., also in the Western States, but rarely found from the Rocky Mountains to the Pacific coast (8).

C. truncatum (Schw.) Andrus & W. D. Moore, stem anthracnose, russeting of pods. Pa. to Ala. and Tex., also Iowa, Md. (6); Va. to Ala. and Tex. (8).

Corticium microsclerotia Weber, web blight. Fla. (6); Fla., La., Miss., N.C., S.C., P.R. (8). SEE ALSO *Pellicularia filamentosa.*

C. solani (Prill. & Del.) Bourd. & Galz.: SEE *Pellicularia filamentosa.*

Corynebacterium flaccumfaciens (Hedges) Dows., bacterial wilt. Mich., N.Y. (4); Ill. (6); Northeastern States (Conn. to Va., Ohio, and Mich.), occasional in the West (Wis. to Colo., Idaho, Oreg., and Mont.) (8).

Diaporthe sp., root rot (?secondary). Ala. (8).

D. arctii (Lasch) Nits., on stems. Ga. (8).

D. phaseolorum (Cke. & Ell.) Sacc., pod blight, leaf spot. Conn. to Fla., La., Okla., and Ohio, P.R. (6).

D. sojae Lehman (*?D. phaseolorum* (Cke. & Ell.) Sacc.), on pods and stems. Ga. (6,8). According to Higgins, these species are distinct, *D. sojae* being saprophytic or weakly parasitic.

Elsinoë phaseoli Jenkins, scab, pod spot. P.R. (6).

Epicoccum spp. (*E. duriaeanum* Mont., *E. neglectum* Desm.), secondary leaf spot. Md., N.J. (6).

E. neglectum Desm., secondary leaf spot. Md., Miss., N.J. (8).

Erwinia carotovora (L. R. Jones) Holland, slimy soft rot of market beans. Occasional (6); cosmopolitan (8).

Erysiphe polygoni DC., powdery mildew. Calif. (1); P.R. (2); Calif., Okla. (4); Calif. (5) Calif., Conn., Fla., Iowa, N.J., N.Y., Tex., Va., P.R. (6); Va. (7); Eastern and Southern States to the Mississippi River, in the Southwest from Tex. to Calif., occasional elsewhere in the West (8).

Fusarium sp., wilt. N.C. (4).

F. oxysporum Schlecht. f. *phaseoli* Kendr. & Snyd., Fusarium yellows. Calif., Colo., Idaho, Mont. (8).

F. oxysporum Schlecht. f. *vasinfectum* (Atk.) Snyd. & Hans., wilt. Ala. (3); associated with root decay and wilt. Ala., Fla. (8).

F. solani (Mart.) Appel & Wr. f. *phaseoli* (Burk.) Snyd. & Hans., root rot. Calif., Tex. (1); N.Y. (3,5); Calif., Ill., Md., Miss., N.Y., Ohio, Pa., Tex., Va., W. Va., P.R. (6). This, or perhaps other species of *Fusarium,* also reported as causing seed decay and seedling blight in Fla., seed stain or pod rot in Calif., Ill., Ind., and Pa. (6). See next entry.

F. solani (Mart.) Appel & Wr. f. *phaseoli* (Burk.) Snyd. & Hans., dry root rot, stem rot, pod rot, wilt. General. This includes both *F. martii* Appel & Wr. var. *phaseoli* Burk. (*F. solani* var. *martii* (App. & Wr.) Wr. f. 3 Snyd.), and the variant distinguished as *F. aduncisporum* Weimer & Harter (=*F. solani* var. *aduncisporum* (Weimer & Harter) Wr.). Other forms of *F. solani* in this inclusive sense have been shown experimentally pathogenic to beans and may be responsible for some of the disease manifestations observed in nature (8).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Heterosporium sp., sooty spot on old leaves and on pods. Occasional in humid regions and seasons (6,8).

Isariopsis griseola Sacc. (*Phaeoisariopsis griseola* (Sacc.) Ferr.), angular leaf spot. P.R. (6); Maine to Fla., Tex., and Okla., P.R., T.H. (8).

I. laxa (Ell.) Sacc., leaf spot. Ind., N.J. (8).

Leptosphaeria phaseolorum Ell. & Ev., on stems. N.J. (8).

Macrophomina phaseoli (Maubl.) Ashby (*Sclerotium bataticola* Taub.), ashy stem blight, charcoal rot, leaf spot, root rot. Calif., Okla. (4); Calif., Ga., N.C., S.C., Okla., Tex. (6); Md. to Ga., Tex., and Colo., also Calif. (8).

Meloidogyne spp, root knot nematodes. T.H. (3); Ariz., Okla. (4); Ark., Calif., Fla., Ga., N.C., Okla., Tex. (6); Calif. (7); Maine to Fla., Tex., and Kans., also Ariz., Calif. (8).

Microsphaera diffusa Cke. & Pk., powdery mildew. Md., Ill. (6); Ga., Md. (8).

M. euphorbiae (Pk.) Berk. & Curt., powdery mildew. Ind. (6).

Mycosphaerella cruenta (Sacc.) Latham, leaf blotch. N.J. to Fla., Tex., and Ark.; Wis. (8). Compare *M. phaseolicola* (Desm.) Sacc.

Nematospora phaseoli Wingard (?=*N. coryli* Pegl.), yeast spot, stigmatomycosis (of seed). Okla. (4); chiefly in the Southeastern States from Md. to Ala. and Tenn., also in Ill. and P.R. (6); P.R. (8). Follows injury by insects (*Nezara viridula*). Small-seeded type especially susceptible (6).

Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. P.R. (2,6,8).

Pellicularia filamentosa (Pat.) Rogers (*Rhizoctonia solani* Kuehn), root and stem rot, stem canker, soil rot of pods. (6); general (8). Commonly occurs in the sterile stage; basidial stage reported on stems in Oreg., and as web blight (*Corticium microsclerotia* (Matz) Weber) in the Gulf States and P.R. (8). *Corticium* (*Rhizoctonia*) *microsclerotia* may also be a synonym but is at least a distinct form from *C.* (*Rhizoctonia*) *solani* as usually identified on beans.

Phakopsora vignae (Bres.) Arth. (II,III), rust. P.R. (6,8). O and I unknown.

Phoma subcircinata Ell. & Ev. (=*Phomopsis*). Conidial stage of *Diaporthe phaseolorum* (6).

P. terrestris Hans., secondary root rot. Calif. (6).

Phyllachora phaseoli (P.Henn.) Th. & Syd., tar spot. P.R. (2).

Phyllosticta phaseolina Sacc., leaf spot, pod spot. Occasional, N.J. to Fla., Tex., and Mich.; P.R. (6); N.Y. to Fla., Tex., and Ind. (8).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,4); Ariz., Tex. (6); Ariz., Okla., Tex. (8).

Phytophthora parasitica Dast., stem rot, pod rot. P.R. (8).

P. phaseoli Thaxt., downy mildew. Eastern and Central States, Vt. to Va., Ky., and Ohio; Minn., P.R. (6).

Pleospora herbarum (Pers. ex Fr.) Rab. (*Stemphylium botryosum* Wallr.) (8).

Pratylenchus pratensis (De Man) Filip., root nematode. Tex. (8).

Pseudomonas coadunata (Wright) Chester, "stickiness" of green beans. Calif. (6).

P. ovalis (Ravenel) Chester, "stickiness" of seed. Va. (6).

P. phaseolicola (Burkh.) Dows. (*P. medicaginis* Sackett var. *phaseolicola* (Burkh.) Stapp & Kotte), halo blight, grease spot, bacterial blight (in part). N.Y. (5); Conn., Ga., Ill., Mass., N.Y., Va. (6); general, especially in the East and sometimes in the Rocky Mountain States, rare on the Pacific coast (8).

P. solanacearum E.F.Sm., brown rot, southern bacterial wilt. Ala., Fla., Ga., Okla.

P. syringae Van Hall (*P. viridifaciens* Tisdale & Williamson), bacterial brown spot, leaf and pod spot,

"soil rot" (pods). From Mass. to Fla., Okla., Oreg., also Wis., P.R. (6); Conn., Fla., Ga., Md., N.J., N.Y., Pa. (8).

Pseudomonas tabaci (Wolf & Foster) F. L. Stevens, "wildfire," bacterial leaf spot. Mass., N.C. (6).

Pullularia pullulans (d By.) Berkhout, seed spot. N.Y. (6,8).

Pythium sp., rootlet rot. Md. (6).

P. anandrum Drechs.—?Calif. (8).

P. aphanidermatum (Edson) Fitzp. (*P. butleri* Subr.), wilt, soil rot. Calif. (6); Calif., Colo., Idaho, N.Y., Okla., Va. (8). Also causes "nesting" or cottony leak of market beans especially in shipments from the Southeastern States (8).

P. arrhenomanes Drechs., root rot. Calif., T.H. (4). *P. rostratum* Butl. and *P. ultimum* Trow also reported associated with seedling blight in Calif. (4).

P. debaryanum Hesse, damping-off, root rot, pod rot. Conn., Del., Fla., Idaho, N.J., N.Y., Ohio, P.R. (8).

P. helicoides Drechs., root rot. Fla. (8).

P. oligandrum Drechs., pod rot. Va. (8); root rot. Fla. (8).

P. rostratum Butl., root rot. Calif. (8).

P. ultimum Trow, damping-off, root rot. Calif. (6,8); probably also as *Pythium* sp.; in Fla. and La. (8).

P. vexans d By.—Md., Va. (8).

Rhizobium phaseoli Dangeard, in root nodules. General (8).

Rhizoctonia sp. (probably mostly *R. solani* Kuehn= *Pellicularia filamentosa*), seed rot, damping-off, root rot, stem canker, soil rot of pods. Cosmopolitan (8).

R. solani Kuehn, root rot, stem canker, "soil rot" of pods. Ill. (3); general (6). Sterile stage of *Pellicularia filamentosa.*

Rhizopus stolonifer (Ehr. ex Fr.) Lind and *R. tritici* K. Saito, soft rot of market beans. Occasional (6); cosmopolitan (8).

Sclerotinia sclerotiorum (Lib.) d By., Sclerotinia wilt, white mold, stem rot. Tex. (4); Va. (4,7); Calif., Ind., N.Y., Tex. (6). Watery soft rot of market beans—(6); general on (8), especially in the South and in irrigated districts in the West (Idaho, Oreg., Wyo.). *S. minor* Jagger, *S. intermedia* Ramsey, and *S. ricini* Godfrey also have been isolated from market beans, in which all cause a similar decay (8).

Sclerotium bataticola Taub.: See *Macrophomina phaseoli.*

Sclerotium rolfsii Sacc., southern blight. Ala. (1); Okla. (4); Va. to Fla. and Miss. (6); Southern States (Va. to Fla., Tex., and Ark.); Calif., P.R. (8).

Stagonospora phaseoli Dearn. (=*S. hortensis* Sacc. & Malbr., according to Petrak), leaf spot. Tenn. (8).

Stemphylium botryosum Wallr., leaf spot. Wash. (8).

Streptomyces scabies (Thaxt.) Waks. & Henrici—Iowa (8), experimental.

Thielaviopsis basicola (Berk. & Br.) Ferr., black root rot. Calif. (6); Ala., Calif., N.H., N.J., N.Y. (8).

Uromyces phaseoli (Pers.) Wint. var. *typica* Arth. (II,III), rust. Calif., Tex. (1); P.R. (2); Ind. (3); Ala., Mass., N.H. (5); widespread but infrequent, Pa. to Miss., Tex., and Ohio, also Calif., P.R. (6); general (8). O and I also on this host but rare. I reported in Oreg. in 1947.

Xanthomonas phaseoli (E.F.Sm.) Dows., bacterial blight. Ind., Mich. (3); Ill., Ind., Mich., Okla., Tex. (4); Ind., N.J., Tex. (5); general (6); Ind., Va. (7); general in the East, sometimes in the Rocky Mountain States, rare on the Pacific coast, Tex. (8). *?X. vignicola* Burk. is also strongly pathogenic and may be implicated in some natural infections; in ?Tex. (8).

X. phaseoli var. *fuscans* (Burkh.) Starr & Burkh., bacterial blight, seed spotting. Colo., Mont., N.Y., Wis., Wyo. (8).

X. solanacearum (E.F.Sm.) Dows.: See *Pseudomonas solanacearum.*

Big bud, phyllody—?virus, possibly *Chlorogenus australiensis* Holmes (Lycopersicon virus 5 K.M.Sm.). Idaho, Oreg., Wash. (6); Ariz., Idaho, Oreg., Wash. (8). This virus may be identical with *Chlorogenus vaccinii* Holmes (Vaccinium virus 1 K.M.Sm.).

Black root—unidentified virus. Ga., ?Colo., Idaho, Oreg. (8).

Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Tex. (1); Ariz., Calif., Idaho, Oreg. (6); Rocky Mountain and Pacific Coast States (Mont. to Tex., Calif., and Wash.) (8).

Greasy pod—virus. Colo., Idaho, Oreg., Wyo. (8).

Mosaic—virus (*Marmor phaseoli* Holmes, Phaseolus virus 1 K.M.Sm.). Ill., Ind., Okla. (4); general (8). Virus—(*?Marmor phaseoli* Holmes)—Ariz., Ind., Mich. (4); Ind., Mich. (7). Identification of this virus is based partly on artificial inoculation and partly on seed transmission. Two races have been differentiated in Idaho, also in Wash., on the basis of varietal differences in the reaction of certain bean varieties. The new strain is infectious to Norida, Red Mexican V.I. 3, and Great Northern V.I. 15. It occurs also in N.Y. It is seed-transmitted (8).

Mosaic, cucumber—*Marmor cucumeris* Holmes, special strain. Wis. (8).

Mosaic—virus (*Marmor cucumeris* var. *phaseoli* Holmes). Conn. to Ga., Tex., and Mo.; Ariz., Calif., P.R. Occurs chiefly on small-seeded type. A yellow mosaic, perhaps caused by a different virus, is reported from Tex. (6).

Mosaic—necrotic strain of yellow mosaic, especially on Blue Lake variety and associated with gladiolus plantings. Oreg., Wash. (8).

Mosaic, southern—*Marmor laesiofaciens* Zaumeyer & Harter. La., ?Miss. A closely related virus identified as *M. laesiofaciens* var. *minor* is reported in Calif., Colo., Idaho, and Md. (8).

Mosaic, yellow—Phaseolus virus 2 K.M.Sm. Colo., Fla., Idaho, Md., Mont., N.Y., Oreg., Pa., Tex., Utah, Va., Wash., Wis., Wyo.; probably general (8).

Mosaics, various—In addition to these naturally occurring viruses the following viruses causing mosaic symptoms are infective to beans by artificial inoculation: pea mottle virus (*Marmor efficiens* F. Johnson), pea wilt virus (*Marmor repens* F. Johnson), also complexes involving mixtures of these such as the viruses of alsike and white clover mosaic and, perhaps, pea streak.

Red node—virus (*Annulus orae* Holmes var. *phaseoli* H. R. Thomas & Zaumeyer). Colo., Idaho, Oreg., Wyo. (8).

Ring spot, necrotic—*Marmor annularium* McK., Nicotiana virus 12 K.M.Sm. Va. (8). Besides the tobacco ring spot virus, the common tobacco mosaic and the alfalfa mosaic viruses may cause necrotic spotting of beans but have not been identified in natural infections.

Witches'-broom—suspected virus. Ariz. (6); Ariz., Wash. (8).

Yellow stipple—virus. Ill. (8).

Baldhead—mechanical injury to seed, crippling or destroying growing point. General, usually in low proportions depending chiefly on moisture content at time of threshing; more frequent in large-seeded type (6,8).

Blossom drop—physiological, correlated with high temperature and low humidity and soil moisture. Also

resulting from feeding injury of plant bugs (*Lygus* spp.). Calif. and general (6); occasional (8).

BRONZE LEAF—physiological, attributed to excessive salt concentration of soil. Colo., Mont., Wyo. (8).

CHLOROSIS—in part nutritional deficiencies, among which the following have been reported: copper—Fla.; magnesium—Fla., Mass., Miss., S.C., Va.; manganese—Fla.; zinc—Fla. Chlorosis due to soil alkalinity is reported in Tex. and Utah and may occur in other Western States (8).

POD DROP—similar to blossom drop but a later stage of growth (6).

SEED PITTING—feeding injury of plant bugs (*Lygus* spp.) producing an effect resembling yeast spot (*Nematospora* sp.) but not involving micro-organisms. Calif., Mich., N.Y. (6).

VARIEGATION (one-sided mosaic)—leaf abnormality of genetic origin, especially in the Idaho Refugee and related varieties. Colo., Idaho, Mont., N.Y., Tex., Wis., Wyo. (8).

ZINC DEFICIENCY ("corral spot"). Calif., Fla. (8). Name from association with areas in fields formerly occupied by horse corrals.

Piptadenia

Piptadenia spp.

Tropical shrubs or trees grown for gum or ornament.

Ravenelia cebil Speg. (II,III), rust. P.R.

Piscidia

P. erythrina L., fishpoison-tree, Jamaica dogwood.

Tree of tropical America; leaves, bark, and twigs when thrown in water stun fish, which then can be caught readily; bark used in medicine for hypnotic effect.

Ravenelia piscidiae Long (II,III), rust. Fla.

Pisum

(1) *P. sativum* L., garden pea.

Annual of Eurasia. Cultivated as a garden crop throughout the United States; as a field crop for canning or freezing chiefly in the Middle Atlantic and Northeastern States, the Upper Mississippi Valley, and on the Pacific coast; and as a seed crop in the Rocky Mountain States and Pacific Northwest.

(2) *P. sativum* L. var. *arvense* (L.) Poir., field pea.

Like the species but more robust, grown as a winter annual in the South and a summer annual in the North for hay, ground cover, and soil improvement.

Alternaria sp., leaf spot, secondary seedling blight. Del., N.H., N.Y. (1).

Aphanomyces euteiches Drechs., root rot. General except (?) northern New England and the north Pacific coast (1); Ala., Ga., Idaho, Miss. (2).

Aristastoma oeconomicum (Ell. & Tracy) Tehon, leaf spot. N.C. (2).

Ascochyta pinodella L. K. Jones, foot rot (one of the factors in *Ascochyta* blight). Conn. and N.Y. to Fla., Ohio, and Minn., also Calif., Colo., Mont., Oreg., Utah, Wash. (1); Ala., Ga., Miss., S.C. (2).

A. pinodes L. K. Jones: SEE *Mycosphaerella pinodes*.

A. pisi Lib., leaf and pod spot. General, but rare in Northwest (1); Ariz., Ga., La., Miss., Mont., Okla., Oreg. (2).

Botrytis cinerea Pers. ex Fr., gray-mold rot of foliage and pods. Occasional in fields (Idaho, Maine, Wash., Alaska), sometimes on market peas (1); Idaho (2).

Cercospora lathyrina Ell. & Ev., leaf spot. Ga., Miss. (2).

C. pisi-sativae Stevenson, leaf spot. Ga., ?La., P.R. (1).

Choanephora conjuncta Couch, leaf and stem rot. Ga. (1).

Cladosporium herbarum Pers. ex Fr., on leaves, pods, and seeds. Alaska, Calif., Ill., Mich., Mont., N.Y. (1). Saprophytic or may be confused with the following.

C. pisicola Snyd., scab, black spot on pods, stems, and leaves. Calif., Maine, Oreg., Tex., Utah, Wash. Perhaps a physiologic race of *C. herbarum*. *?C. myriosporum* Ell. & Dearn. also has been reported from N.Y. and Wyo. (1).

Colletotrichum pisi Pat., anthracnose, leaf and pod spot. Conn., Ga., Iowa, Maine, Minn., Tex., Wis. (1); La., Tex. (2).

Cuscuta sp., dodder. Mo. (1).

Erysiphe polygoni DC., powdery mildew. General (1); Fla., Ga., La., Maine, Miss., Tex. (2).

Fusarium sp. (probably *F. solani* (Mart.) Appel. & Wr. f. *pisi* (F. R. Jones) Snyd. & Hans.), root rot. Ala., Ga., Kans., Miss., Va., Wash. (2).

F. orthoceras Appel. & Wr. var. *pisi* Linford (*F. oxysporum* Schlecht. f. *pisi* Linford race 1), wilt. Mass. to Va., Ill., and Minn., also Calif., Colo., Idaho, Mont., Oreg., Tex., Wash. (1).

F. oxysporum Schlecht. f. *pisi* Snyd. race 2, near-wilt. N.H. to S.C., Ill., Nebr., and Minn., also Calif., Colo., Idaho, Mont., Oreg., Wash. (1). *F. oxysporum* f. *medicaginis* (Weimer) Snyd. & Hans. caused root rot of peas in naturally infested soil in Miss.; also by artificial inoculation in Kans. (1).

F. solani (Mart.) Appel & Wr. f. *pisi* (F. R. Jones) Snyd. & Hans. (*F. martii* Appel & Wr. var. *pisi* F. R. Jones), root rot. N.Y. to Fla., Mo., and Minn., also Calif., Colo., Idaho, Mont., N. Mex., Oreg., Wash., Wyo. (1).

Fusarium spp., root rot, wilt, seedling blight. Besides the foregoing, *F. equiseti* Cda. var. *bullatum* (Sherb.) Wr., reported as causing wilt in Minn. (1); *F. merismoides* Cda., basal stem rot—Ariz. (1); *F. moniliforme* Sheldon, associated with root rot—Miss. (1); *F. scirpi* C. R. Lambert & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., wilt—Minn., Wis. (1).

Fusicladium pisicola Linford, black leaf. Idaho, Utah (1).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Heterosporium sp., secondary leaf spot. Mont. (1).

Macrophomina phaseoli (Maubl.) Ashby, ashy stem blight. Tex. (1).

Meloidogyne spp., root knot nematodes. Ariz., Calif., Fla., N.C., S.C., Tex., Utah, Wis., T.H. (1); Ga., N.C. (2).

Mycosphaerella pinodes (Berk. & Blox.) Vest., *Mycosphaerella* (*Ascochyta*) blight, foot rot. Widespread, probably general, but distribution records unreliable owing to confusion with *Ascochyta* leaf spot and foot rot (1); Ala., Ga., Oreg., Tex. (2).

Pellicularia filamentosa (Pat.) Rogers (*Rhizoctonia solani* Kuehn), root rot, stem canker, damping-off. General (1).

Peronospora viciae (Berk.) Casp. (*P. pisi* Syd.), downy mildew. General, especially in the North Central and Pacific Coast States; infrequent in the Northeast and Rocky Mountain pea districts (1); Ala., Ga., La., Miss., Oreg. (2).

Peronospora pisi Syd. is probably only a physiologic race of *P. viciae* (Berk.) Casp.

Phoma sp., root and stem rot. N.J., Wis. (1). (Perhaps a form of or sequel to *Ascochyta pinodella*).

P. terrestris Hans., secondary root rot. Iowa (1).

Phyllosticta sp., associated with black leaf. Utah (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (1).

Phytophthora sp. (*?Pythium*), root rot. Calif., Conn. (1).

P. parasitica Dast., pod rot. P.R. (1).

Pleospora hyalospora Ell. & Ev., leaf spot. Miss. (1).

Pseudomonas pisi Sackett, bacterial blight. General, especially in the East and South (1); Ga., Miss., Mont., N.C., S.C., Wash. (2).

Pullularia pullulans (d By.) Berkh., seed spot. N.Y. (1).

Pythium spp., root rot (chiefly of small roots and seedlings), damping-off, pod rot, shoot-tip blight. *P. aphanidermatum* (Edson) Fitzp.—Utah (1); *P. debaryanum* Hesse reported most frequently, especially in the Middle Atlantic States, also in Calif., Fla., Wis. (1); *P. dissotocum* Drechs.—Del., Md., N.J., Wis. (1); *P. graminicola* Subr.—Ala., Ga., Miss. (2); *P. helicoides* Drechs.—?Calif. (1); *P. irregulare* Buis.—Ala., Ga., Miss. (2); *P. oligandrum* Drechs. (usually a secondary invader of roots, may sometimes attack fruits, etc.)—Conn., Del., Md., N.J., N.Y., Wis. (1); *P. salpingophorum* Drechs.—N.Y. (1); *P. ultimum* Trow—Calif., Mont., N.Y., Wis. (1); *P. vexans* d By.—Del., Md., N.J. (1).

Rhizobium leguminosarum Frank em. Baldwin & Fred, in root nodules. General (1).

Rhizoctonia sp. (probably *R. solani* Kuehn), root rot, stem canker. Colo., Ga., Kans. (2). SEE ALSO *Pellicularia filamentosa.*

Rhizopus stolonifer (Ehr. ex Fr.) Lind, black mold of market peas. Cosmopolitan (1).

Sclerotinia sclerotiorum (Lib.) d By., stem rot, pod rot, Sclerotinia wilt. Del., Fla., N.J., Pa., Va., Calif., Idaho, Mont., Tex., Wash. (1); Ga., Idaho (2).

Sclerotium rolfsii Sacc., southern blight. Fla. (1).

Septoria flagellifera Ell. & Ev., leaf spot. Minn., N. Dak., S. Dak., Wis. (1).

S. pisi West., leaf blotch. Widespread but infrequent; Iowa, Tex. (1); Ala., Ga., Miss., S.C. (2).

?S. viciae West., stem rot, scald. Oreg. (2).

Sporocybe byssoides Pers. ex Fr., on dead stems. Va. (1).

Stemphylium polymorphum Bon. (*?S. botryosum* Wallr.), leaf spot. Maine (1).

Thielavia basicola Zopf, on dead roots. N.C. (2). Presence is indicator of *Thielaviopsis basicola.*

Thielaviopsis basicola (Berk. & Br.) Ferr., black root rot. Ark., Calif., Conn., Md., Mont., N.J., N.Y., Pa., Wis. (1).

Uromyces fabae (Pers.) d By. (O,I,II,III), rust. Calif., Idaho, Maine, Mass., Minn., N. Dak., Nebr., Wash., Wyo. (1); Tex. (2).

MOSAIC, COMMON—pea mosaic virus (*Marmor leguminosarum* Holmes, Pisum virus 2 K.M.Sm.). General, T.H. (1); Ala., Ga., Mich., Miss., N.J. (2).

MOSAIC, ENATION (pod deforming)—pea enation mosaic virus (*Marmor pisi* Holmes, Pisum virus 1 K.M.Sm.). Calif., Idaho, N.J., N.Y., Oreg., Wash., Wis. (1). Probably general but not distinguished from the preceding.

MOSAIC, VEINAL—red clover vein mosaic virus (*Marmor trifolii* Holmes). N.J. (1,2).

MOTTLE (severe mosaic)—pea mottle virus (*Marmor efficiens* F. Johnson). Wash., perhaps also in Colo., Idaho, N.J., N.Y., Va. Properties and host range relate this virus to the yellow mosaic virus of bean (Phaseolus virus 2) which is experimentally infectious to peas; natural infection reported in N.J., N.Y., and Wis. (1).

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Wis., T.H. (1). Probably one of the diseases that has been called "streak."

STREAK—virus(es). One form of pea streak is caused by combined infection with the mottle and wilt viruses. Another, perhaps distinct, form is attributed to a single virus, pea streak virus 1 Zaumeyer (*?Marmor trifolii* Holmes). Pea streak has also been induced by artificial inoculation with alfalfa mosaic virus, and by one or more strains of cucumber mosaic virus. Streak diseases have been reported in the Middle Atlantic States (Del., Md., N.J., N.Y., Va.), and in the West (Calif., Colo., Idaho, Mont., Wash.) (1). Pea streak in Wis. is apparently not due to bean yellow mosaic virus, as shown by lack of cross-protection.

STUNT—pea stunt mosaic virus (pea mosaic virus 5 Zaumeyer). Colo. (1). Perhaps a form of mottle (severe mosaic) and related to the yellow mosaic virus of *Phaseolus.* Hagedorn and Walker (Jour. Agr. Res. 78: 617-626. 1949) describe another pea disease as stunt, occurring in Wis. They distinguish it from Zaumeyer's "pea stunt mosaic" (pea mosaic virus 5). It is also distinguished from other pea viruses of the common mosaic, enation mosaic, and pea wilt groups.

WILT—pea wilt virus (*Marmor repens* F. Johns.). Wash., ?Colo., Idaho, Va. (1). In conjunction with pea mottle virus causes a streak disease.

CHLOROSIS—nutritional deficiency associated with alkaline soil. Tex., Wash. (1). Yellowing due to deficiency of manganese and zinc has been reported in Fla. (1).

INTUMESCENCE—swellings on pods, in part parasitic (fungi, viruses), perhaps more frequently physiological and related to hydrotic factors. Calif., N.J., Wash. (1).

SEED SPOTTING—apparently nonparasitic but cause not determined. Surface type, in Surprise and related varieties—Calif., Conn., Idaho, Maine, Mont., Okla., Va., Wis. (1). Internal breakdown, in Laxtonian variety—Calif. (1).

Pithecellobium

(1) *P. flexicaule* (Benth.) Coult., ebony blackbead, and *P. pallens* (Benth.) Standl., huajillo.

Evergreen shrubs or small trees of range 17; *P. pallens* grown for wood and for ornament.

(2) *P. unguis-cati* (L.) Benth., catsclaw, blackbead, bread-and-cheeses, and *P. dulce* (Roxb.) Benth., guamachil, Manilla tamarind.

P. unguis-cati, a small tree of southern Florida and the West Indies with astringent bark and medicinal seeds; *P. dulce,* a large stately tree of tropical America and Pacific Islands, grown for ornament in southern Florida and southward.

Colletotrichum erythrinae Ell. & Ev., leaf spot. Tex. (on *P. flexicaule*); P.R. (2).

Exosporium sp.—Fla. (on *P. dulce.*)

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Hysterographium pithecellobii Seaver, on twigs. P.R. (2).

Meloidogyne sp., root knot nematodes. (2).

Pestalotia funerea Desm., leaf spot. Tex. (1).

Phomopsis sp., twig blight. Fla. (2).

Phyllosticta pithecolobii E.Young, leaf spot. Tex., P.R. (2).

Physalospora fusca N. E. Stevens and *P. rhodina* (Berk. & Curt.) Cke., on branches. Fla. (2).
Polyporus gilvus Schw. ex Fr. wood rot. T.H. (2).
Ravenelia gracilis Arth. (O,I,II,III), rust. Tex. (1).
R. pithecolobii Arth. (II,III), rust. Fla. (on *P. guadelupense* Chapm.); Tex. (on *P. flexicaule*); P.R. (2).
R. siderocarpi Long (II,III), rust. Tex. (1).

Poinciana

See *Caesalpinia.*

Prosopis

Prosopis spp., mesquite, screwbeans.

Spiny shrubs or small trees. Range 9,11,16, 17,19,20,25,29,30. Valuable for forage and honey. The common mesquite, *P. juliflora* (Sw.) DC. (including var. *velutina* (Woot.) Sarg., var. *torreyana* Benson, and var. *glandulosa* (Torr.) Cockerell), occurs in a variety of forms often designated as species. The screwbeans, *P. pubescens* Benth. and *P. cinerascens* (A. Gray) A. Gray (sometimes segregated as the genus *Strombocarpa*), occur in range 9,10, 11,17.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, ?branch and trunk galls. Tex.
Cercospora prosopidis Heald & Wolf, leaf blight. Tex.
Didymosphaeria cryptosphaerioides Rehm, on branches. Tex.
Fomes everhartii (Ell. & Gall.) Schrenk and *F. rimosus* (Berk.) Cke., white heart rot. Ariz., Tex.
Gloeosporium leguminum (Cke.) Sacc., pod spot. Tex.
Leveilulla taurica (Lév.) Arn.—Mex., Tex. Probably throughout the range of the host, but specific reports lacking.
Napicladium prosopodium Tharp, leaf spot. Tex.
Phoma sp., black pod spot. T.H.
Phoradendron californicum Nutt. and *P. flavescens* (Pursh) Nutt. var. *macrophyllum* Engelm., mistletoe. Tex. to Calif.
Phyllosticta juliflora Ell. & Barth., leaf and pod spot. Okla., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora mutila (Fr.) N. E. Stevens, on branches. T.H.
Polyporus adustus Willd. ex Fr.—Tex.
P. pinsitus Fr.—Tex.
P. texanus (Murr.) Sacc. & Trott., white-mottled heart rot. Ariz., Tex.
Ravenelia arizonica Ell. & Ev. (II,III), leaf rust, sometimes galls. Tex. and Okla. to Calif.
R. holwayi Diet. (O,I,II,III), leaf rust, sometimes galls. Tex. to Calif.
Schizophyllum commune Fr., heart rot. Tex.
Scleropycnium aureum Heald & Lewis, leaf blight. Ariz., Tex.
Sphaeropsis prosopodis Dearn. & Barth., on branches. Tex.

Psoralea, scurf-pea

(1) *P. esculenta* Pursh, Indian breadroot.
(2) *P. argophylla* Pursh
(3) *P. canescens* Michx., buckroot.
(4) *P. macrostachya* DC.
(5) *P. lanceolata* Pursh
(6) *P. tenuiflora* Pursh (*P. floribunda* Nutt.).

Chiefly perennial herbs of prairies and plains in the Central and Western States: (1) has edible tuberous roots; (2,3,4) are of food value to wildlife; (5,6) are useful in erosion control.

Actinonema psoraleae Ell. & Ev. (*?Ascochyta*), leaf spot. On *P. digitata* Nutt. in Kans.
Cercospora latens Ell. & Ev., leaf spot. Kans. (2), Tex. (6).
C. psoraleae Ray, leaf spot. On *P. digitata* in Okla.
Dicoccum psoraleae Ell. & Barth., on foliage and stems. Kans. (6).
Diplodina psoraleae Ell. & Barth. (*Diplodinula psoraleae* Tassi), on dead stems. Kans. (6).
Erysiphe polygoni DC., powdery mildew. Mont. (6).
Gloeosporium psoraleae Pk., on leaves. Nebr. (1). *G. psoraleae* Kell. & Swing. on (3) in Fla. is a nomen nudum.
Microsphaera diffusa Cke. & Pk., powdery mildew. On *P. physodes* Dougl. in Wash.
Parodiella griffithsii Th. & Syd., black mildew. Mont. (6). Collections in Colo., Kans., N. Mex., Okla., and S. Dak., referred to *P. perisporioides*, may also belong here.
P. perisporioides (Berk. & Curt.) Speg., black mildew. Kans., N. Dak., Nebr., S. Dak. (2). Perhaps the preceding species rather than this.
Phyllosticta psoraleae (Cke.) Tassi, leaf spot. S.C. (?3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (6).
Puccinia andropogonis Schw. var. *onobrychis* (Burr.) Arth. (O,I), rust. On *P. onobrychis* Nutt. in Ill. II and III on *Andropogon* spp.
Ramularia psoraleae Ell. & Ev., leaf spot. Calif. (4); Tex. (6); on *P. physodes* Dougl. in Oreg.
Septoria argophylla Ell. & Kell., leaf spot. Kans. (2).
S. psammophila Sacc., stem and ?leaf spot. N. Dak. (5).
S. umatillensis Sprague, leaf spot. On *P. lanceolata* var. *scabra* (Nutt.) Piper in Oreg.
Uromyces abbreviatus Arth. (O,III), rust. On *P. physodes* in Calif. and Wash.; on *P. purshii* Vail, Nev.; on *Psoralea* sp., Idaho.
U. psoraleae Pk. var. *argophyllae* (Seym.) Arth. (O,I,III), rust. On (2,6) and other species from Minn. to Tex., Ariz., and Mont.
U. psoraleae var. *typica* Arth. On (5) and other species from S. Dak. to N. Mex., Ariz., and Oreg.

Pueraria

(1) *P. thunbergiana* (Sieb. & Zucc.) Benth., kudzu.
(2) *P. phaseoloides* (Roxb.) Benth., tropical kudzu.

Perennial vines of eastern Asia: (1) introduced in the Southeastern States as a cover and soil-binding plant, becoming naturalized from Maryland to Florida and Louisiana; (2) is preferred for green forage.

Alternaria sp., secondary leaf spot. N.J. (1).
Botryosphaeria ribis Gross. & Dug., on dead stems. Ga. (1).
Cercospora puerariicola Yamanoto (=*Mycosphaerella puerariicola* Weimer & Luttrell), angular leaf spot. Ala., Ga., Miss.
Corticium microsclerotia Weber, web blight. Ga., Miss.
Diplodia puerariae Barth. (*?Physalospora rhodina* (Berk. & Curt.) Cke.), on dead stems. Md. (1), Tex.
Fusarium sp., stem rot. La. (2).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

Macrophomina phaseoli (Maubl.) Ashby, stem rot. Ga.
Meloidogyne spp., root knot nematodes. Calif., Ga., Tex., general (1).
Phoma sp., on stems. La. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora obtusa (Schw.) Cke., on dead stems. Va. (1).
Pseudomonas phaseolicola (Burkh.) Dows., halo blight. Conn. to Fla., La., and Ind. (1).
P. syringae Van Hall, bacterial blight. N.J. (1).
Rhizoctonia solani Kuehn, damping-off. Ala., Ga.
BLACK PATCH—sterile fungus. Ga.

Rhynchosia

Rhynchosia spp.

Perennial herbs, usually in sandy, open ground in the Southern States and tropical America. Several species are of food value to wildlife.

Ascochyta rhynchosiae (Thuem.) Sacc., leaf spot. On *R. simplicifolia* (Walt.) Wood, S.C.
Erysiphe polygoni DC., powdery mildew. On *R. minima* (L.) DC., P.R.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meliola bicornis Wint., black mildew. On *R. reticulata* (Sw.) DC., P.R.
Meloidogyne sp., root knot nematodes. On *R. simplicifolia* var. *intermedia* (Torr. & Gray) Hermann, Fla.
Parodiella paraguayensis Speg., black mildew. On *R. cinerea* Nash, Fla.
P. perisporioides (Berk. & Curt.) Speg., black mildew. On *R. reticulata*, P.R.; *R. simplicifolia*, S.C.; *R. texana* Torr. & Gray, Tex.; *R. difformis* (Ell.) DC., N.C.
Phyllosticta rhynchosiae Miles, leaf spot. On *R. tomentosa* (L.) H. & A., Miss.
Synchytrium aecidioides (Pk.) Lagh., leaf gall, false rust. P.R., V.I.
Uromyces dolicholi Arth. (II,III), rust. On *R. minima*, P.R.; *R. reticulata*, P.R.; *R. texana*, Tex. O and I unknown.

Robinia, locust

(1) *R. hispida* L., bristly locust, mossy locust, rose-acacia.

Shrub of range 25,27,28; cultivated for ornament, zone 5.

(2) *R. pseudoacacia* L., black locust, false-acacia.

Large, but short-lived, tree of eastern North America, widely cultivated and naturalized, zone 3; grown for timber, soil conservation, shade, and ornament in numerous geographic and horticultural forms; important honey plant.

(3) Other species, especially *R. neomexicana* Gray, New Mexico locust, and *R. viscosa* Vent., clammy locust.

The species *neomexicana* is a shrub or small tree of range 9,10,11,14; *R. viscosa*, a tree of range 27,28,29, cultivated in zone 3.

Aglaospora anomia (Fr.) Lamb. (*A. profusa* (Fr.) Ces. & de N.), canker, twig blight. Maine to Ga. and Mich. (2).
Alternaria sp., seedling leaf blight. N.C. to Ala. and Mo. (2).
A. fasciculata (Cke. & Ell.) Jones & Grout (*?A. tenuis* Auct.), leaf spot. N. Dak. (1).
Armillaria mellea Vahl ex Fr., root rot. (2).
Botryosphaeria ribis Gross. & Dug., on branches. Ga., Tenn., Va. (2).
Calonectria dearnessi Ell. & Ev., on branches. Mo. (2).
Cladosporium epiphyllum Pers. ex Fr., ?leaf spot. Tenn., W. Va. (2).
Coryneum trimerum Sacc., on branches. Idaho, Wash. (2).
Cryptosporium robiniae Dearn. & House, on twigs. N.Y. (2).
Cucurbitaria elongata (Fr.) Grev. (*Camarosporium robiniae* (West.) Sacc.), on branches. Widespread (2), N.Y. (3).
Cuscuta sp. and *C. arvensis* Beyr., dodder, on seedlings. Md. to Ark. and Mo. Widespread (2).
Cylindrosporium solitarium Heald & Wolf, leaf spot. Tex. (2). SEE ALSO *Phleospora*.
Cytospora coccinea (Reb.) Fr. and *C. leucosperma* Pers. ex Fr.—(2). Conidial stage of *Aglaospora anomia*.
C. orthospora Berk. & Curt. and *C. robiniae* Schw.: SEE *Phomopsis oncostoma*.
Daedalea unicolor Bull. ex Fr., wood rot. Wis. (2).
Diaporthe oncostoma (Duby) Fckl. (*Phomopsis oncostoma* (Thuem.) Hoehn.), canker, dieback. N.Y. to Ga. and Ill. (2).
Dothiorella glandulosa (Cke.) Sacc., on branches. Va., W. Va. (2).
Erysiphe polygoni DC., powdery mildew. Calif. (2).
Fomes applanatus (Pers. ex Fr.) Gill., white-mottled heart rot. Calif. (2).
F. igniarius (L. ex Fr.) Kickx, white spongy heart rot. Ill., W. Va. (2).
F. rimosus (Berk) Cke., yellow spongy heart rot. Mass. to Ala., Fla., N. Mex., and Wis. on living trees (2); Ariz., N. Mex. (3).
Fusarium sp., seedling root rot. Ala., Ga. (2).
F. avenaceum (Fr.) Sacc., on twigs. Pa. (2).
F. sarcochroum (Desm.) Sacc., twig canker. Iowa (2).
Fusicladium robiniae Shear, seedling leaf blight. Md. to Ala., Mo., and Wis. (2).
Gibberella baccata (Wallr.) Sacc. (*Fusarium lateritium* Nees), on twigs. Mich., S.C. (2).
Gloeosporium revolutum Ell. & Ev., leaf spot. N.J. (2).
Herpotrichia lanuginosa (Berk. & Curt.) Ell. & Ev., on decaying wood. S.C., Va. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Heterosporium robiniae Kab. & Bub., on leaves. N.Y. (2).
Macrophoma numerosa Pk., on branches. N.Y., Pa. (2).
Melanconium viscosum Schw., on dead branches. Mo., Pa. (2); Pa. (3).
Meloidogyne spp., root knot nematodes. Okla., Tex. (2).
Microsphaera diffusa Cke. & Pk., powdery mildew. Ill., N.C. (2).
Nectria cinnabarina Tode ex Fr., on branches. Widespread (2).
N. coccinea Pers. ex Fr.—W. Va. (2).
Phleospora robiniae (Lib.) Hoehn., leaf spot. N.Y. to Ohio and Wis. (2). (Reported also as *Cylindrosporium* or *Septoria*).
Phomopsis oncostoma (Thuem.) Hoehn., on twigs. N.J. (3).
Phoradendron flavescens (Pursh) Nutt., mistletoe. N.C., Tex. (2).
P. flavescens var. *macrophyllum* Engelm. Ariz., N. Mex. (2).
Phyllactinia corylea Pers. ex Karst., powdery mildew. N. Mex. (2,3).

Phyllosticta robiniae Sacc., leaf spot. La. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1); Okla., N. Mex., Tex. (2); Tex. (3).
Physalospora obtusa (Schw.) Cke., on branches. Maine to Va. and Mich., also Kans. (2); Pa. (3).
Phytophthora cinnamomi Rands, seedling root rot. Md. (2).
P. parasitica Dast., seedling top wilt. Ala., N.C., Va. (2).
Polyporus spp., wood rot, sometimes sapwood or heart rot of living trees: *P. biformis* Klotzsch—Ky. (2); *P. gilvus* (Schw.) Fr.—W. Va., Wis. (2); *P. hirsutus* Wulf. ex Fr.—N.Y. (2); *P. obtusus* Berk.—Md., Tex. (heart rot) (2); *P. unita* Pers. ex Karst.—Idaho, Ind., Ky., Va. (2).
P. robiniophilus (Murr.) Lloyd, white spongy heart rot. Pa. to Va., Mo., and Mich. (2).
P. sulphureus Bull. ex Fr., brown cubical heart rot. Mass., N.Y., W. Va. (2).
Poria spp., wood rot: *P. ambigua* Bres.—Mich. (2); *P. ferruginosa* (Schrad. ex Fr.) Bres.—W. Va. (2); *P. incrassata* (Berk. & Curt.) Burt, on posts—widespread (2); *P. robustus* Karst.—Calif. (2); *P. umbrina* Fr.—Md., Va. (2).
Pratylenchus sp., root nematode. Oreg. (2).
Pseudovalsa profusa (Fr.) de N.: See *Aglaospora anomia.*
Pythium spp., damping-off. Nebr., Tex. (2).
P. myriotylum Drechs., seedling root rot. N.C. (2).
Rhabdospora breviuscula (Berk. & Curt.) Sacc., on branches. S.C. (2).
Rhizoctonia bataticola (Taub.) Butler, seedling stem rot. Ala., N.C. (2).
R. solani Kuehn, damping-off, seedling leaf blight. Md. to Ala., Tex., and Nebr. (2).
Sclerotium bataticola Taub., seedling stem rot. Tex. (2).
Septoria curvata (Rab. & Br.) Sacc.: See *Phleospora robiniae.*
Sphaeropsis robiniae Ell. & Barth.: See *Physalospora obtusa.*
Thielavia basicola Zopf, on dead roots. Wis. (2). Probably follows *Thielaviopsis.*
Tryblidiella rufula (Spreng. ex Fr.) Sacc., on twigs. Ala. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Ill. (2).
Xylaria longeana Rehm and *X. polymorpha* (Pers.) Grev., wood rot, usually on stumps or dead trunks. Cosmopolitan (2).
Witches'-broom (brooming disease)—Robinia brooming virus (*Chlorogenus robiniae* Holmes, *Polycladus robiniae* McK., Robinia virus 1 Hartley & Haasis ex K.M.Sm.). Pa. to Ga. and Ark., ?Nev., Pa. to N.C., Ohio, Ky. (2).
Chlorosis—mineral deficiency, probably iron, in alkaline soil. Nebr., Tex. (2).
Little leaf—zinc deficiency. Calif. (2).

Samanea

S. saman (Jacq.) Merr., raintree, saman.

Large tree of West Indies and Central America, grown for ornament.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Hypomyces haematococcus (Berk. & Br.) Wr., on bark. T.H.
Meloidogyne sp., root knot nematodes. Fla.
Microstroma pithecolobii Lamkey, leaf spot. P.R.

Schrankia

S. nuttallii (DC.) Standl. of Auct., non Willd., sensitive-brier.

Woody perennial of the Southeastern States; of food value to wildlife and sometimes grown for ornament.

Cercospora morongiae Tracy & Earle, on stems. Miss.
Ravenelia morongiae Long (II,III), rust. Tex.

Sesbania

S. exaltata (Raf.) Cory, hemp sesbania.

Annual of South Central and Southwestern States, of food value to wildlife and sometimes grown for soil improvement and fiber. (For *S. vesicaria* Elliott: See *Glottidium vesicarium.*)

Botryosphaeria minor Ell. & Ev., on stems. La.
Diaporthe arctii (Lasch) Nits., on stems. La.
Erysiphe ?cichoracearum DC., powdery mildew. Calif.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Macrophomina phaseoli (Maubl.) Ashby—Tex.
Meloidogyne spp., root knot nematodes. Calif., Tex.
Mycosphaerella sp. (*Sphaerella sesbaniae* Ell. & Ev.), on stems. La.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora sesbaniae Ell. & Ev., on stems. La.
Pratylenchus sp., root nematode. Calif.
P. pratensis (De Man) Filip., root nematode. N.C., ?Calif.

Soja

S. max (L.) Piper. See *Glycine.*

Sophora

(1) *S. japonica* L., Japanese pagodatree.

Deciduous tree of eastern Asia, grown for ornament and sometimes street planting, zone 4.

(2) *S. secundiflora* (Ort.) Lag., frijolito, mescalbean.

Evergreen shrub or small tree. Range 11,16, 17,20,30.

(3) *S. sericea* Nutt., silky Sophora.

Woody herb of the Great Plains.

(4) *S. davidi* (Franch.) Skeels, vetchleaf Sophora.

Deciduous shrub of China, grown for ornament, zone 5.

Cytospora sophorae Bres., on twigs. N.H., N.J., N.Y. (1).
Diplodia sophorae Speg. & Sacc., dieback. Ohio (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md. (4).
Microsphaerea alni DC. ex Wint., powdery mildew. Conn. (1).
Nectria cinnabarina Tode ex Fr., twig blight. Conn., N.Y. (1).
Phoradendron flavescens (Pursh) Nutt., mistletoe. Tex. (2).
Phyllosticta sophorae Ell. & Ev., leaf spot. Okla., Tex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,4).
Rhizoctonia solani Kuehn, damping-off. Conn. (1).
Uromyces hyalinus Pk., (O,I,III), rust. S. Dak. to Tex., Ariz., and Wyo. (3).
Brooming disease—?virus. Va. (on *Sophora* sp.). Symptoms like cranberry false blossom.

Spartium

S. junceum L., Spanish-broom, weavers-broom.

Handsome shrub of Mediterranean region, cultivated for ornament, zone 7, especially California.

Diplodia sarothamni Cke. & Harkn., on twigs. Calif.
Pestalotia polychaetia Cke. & Harkn., on twigs. Calif.
Phoma sarothamni Sacc., on twigs. Calif. A synonym of *Phomopsis sarothamni* (Sacc.) Hoehn., conidial stage of *Diaporthe sarothamni* (Auers.) Nits., which is not reported from the U. S.

Stizolobium

See *Mucuna*.

Strophostyles, wildbean

(1) *S. helvola* (L.) Ell.
(2) *S. leiosperma* (Torr. & Gray) Piper
(3) *S. umbellata* (Muhl.) Britt.

Annual (1,2), or perennial (3), trailing vines of sandy plains and open woods in the Eastern and Southern States to the western Plains; of food value to wildlife.

Cercospora cruenta Sacc. (=*Mycosphaerella cruenta* (Sacc.) Latham), leaf spot. Ill. (1).
Erysiphe polygoni DC., powdery mildew. Iowa, Minn., Mo. (1); Okla. (2).
Macrophomina phaseoli (Maubl.) Ashby, stem blight. Ga. (1).
Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. Va. (1).
Phomopsis sojae Lehman (=*Diaporthe phaseolorum* (Cke. & Ell.) Sacc. var. *sojae* (Lehman) Wehm.), stem blight. Ga.
Phyllosticta phaseolina Sacc., leaf spot. Iowa, Kans., N.J., Ohio, Okla., Wis. (1); Kans., Nebr., Tex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Uromyces phaseoli (Pers.) Wint. var. *strophostyles* Arth. (O,I,II,III), rust. R.I. to Ala., Okla., Nebr., and Wis. (1); N.J. to Miss., Tex., and S. Dak. (2); Ind., Mo., N.C., Pa. (3).
Xanthomonas phaseoli (E. F. Sm.) Dows., bacterial blight. Ind. (1).
Mosaic—unidentified virus. Ind.

Tamarindus

T. indica L., tamarind.

Tropical evergreen tree grown for edible fruit, timber, and ornament in southern Florida and the West Indies.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla.

Tephrosia, hoary-pea

(1) *T. spicata* (Walt.) Torr. & Gray
(2) *T. virginiana* (L.) Pers., goatsrue, rabbit-pea.
(3) Other species.

Herbaceous or somewhat shrubby perennials of dry, sandy plains or open woods, chiefly in the South, except (2) which occurs throughout the Eastern and Central States; of food value to wildlife; (2) contains rotenone.

Cercospora tephrosiae Atk., leaf spot. Ala. (1).
Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. Fla. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Ravenelia caulicola Arth. (II,III), rust. P.R. (on *T. cinerea* (L.) Pers.).
R. epiphylla (Schw.) Diet. (O,I,II,III), rust. Ala., Fla., S.C. (1); Conn. to Fla., La., and Wis. (2).

Teramnus

T. uncinatus (L.) Sw.

Woody vine of tropical America.

Cercospora maricaoensis Young, leaf spot. P.R.
Meliola bicornis Wint., black mildew. P.R.
Phakopsora vignae Arth. (II), rust. P.R.
Phyllachora galactiae Earle, black leaf spot. P.R.
Uromyces cologaniae Arth. (II,III), rust. P.R.

Thermopsis

Thermopsis spp., bush-pea, golden-pea.

Perennial herbs, chiefly of plains and open ground, different species ranging widely in the United States; sometimes grown for ornament; of food value to wildlife.

Cercospora thermopsidis Earle, leaf spot. Colo., Mont.
Erysiphe polygoni DC., powdery mildew. Rocky Mountains and Pacific Northwest.
Macrophoma thermopsidis (Ell. & Gall.) Sacc. & Syd., on stems. Mont., N. Mex., ?Colo.
Phoma thermopsidicola P.Henn., leaf spot. Calif.
Ramularia sphaeroides Ell. & Ev., leaf spot. Wash.
Stigmina thermopsidis Harkn., leaf spot. Calif.

Trifolium, clover, trefoil

I. Annual Species, of European Origin

(1) *Trifolium agrarium* L., yellow, or hop, clover.

Naturalized throughout the eastern United States and in the Southeast, occasionally west to Iowa; utilized by wildlife.

(2) *T. alexandrinum* L., Egyptian clover.

From the Mediterranean region, cultivated as a winter cover crop in Arizona and southern California; utilized by wildlife.

(3) *T. arvense* L., rabbit-foot clover, old-field clover, stone clover.

Naturalized in old fields and waste ground in the Eastern and Central States; furnishes food for wildlife.

(4) *T. dubium* Sibth., least hop clover, sometimes called "true shamrock."

Naturalized throughout the eastern United States and in the Pacific Northwest.

(5) *T. incarnatum* L., crimson clover.

Grown as winter cover crop and for soil improvement chiefly on the Atlantic and Gulf Coastal Plains and locally in the Central States; also occasionally naturalized.

(6) *T. procumbens* L., low hop clover.

Naturalized throughout the eastern United

States; used in the Northwest as a pasture plant; of appreciable food value to wildlife.

Botrytis sp., gray-mold leaf blight and stem rot. Del., Ky. (5).

Cercospora zebrina Pass., leaf spot. N.J., N.Y. (1); Wis. (4); Del., La., Md., Miss., Tenn., Va. (5).

Colletotrichum destructivum O'Gara, anthracnose. N.J. (6).

C. trifolii Bain & Essary, southern anthracnose. Ky., N.C. (5).

Cymadothea trifolii (Pers. ex Fr.) Wolf (*Polythrincium trifolii* G.Kunze), sooty blotch. Maine to Ala., La., and N. Dak. (5).

Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (3).

Dothidella trifolii (Pers. ex Fr.) Bayl.-Elliott & Stansf.: See *Cymadothea trifolii*.

Erysiphe polygoni DC., powdery mildew. Conn., Ill., La., N.Y., Pa., Tenn. (1); Ark., Ga., La., Miss. (4); Ga., La. (5); Ark., Ga., Md., Miss., N.C. (6).

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

Kabatiella caulivora (Kirchn.) Karak., northern anthracnose. N.C., Va. (5).

Meloidogyne spp., root knot nematodes. Calif. (2); Fla., S.C. (5).

Peronospora trifoliorum d By., downy mildew. Oreg. (4).

Phyllosticta sp., leaf spot. Tenn. (5).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (5,6).

Polythrincium trifolii G.Kunze ex Fr.: See *Cymadothea trifolii*.

Pratylenchus sp., root nematode. Oreg. (5).

Pseudomonas syringae Van Hall (*P. trifoliorum* L.R. Jones, Williamson, Wolf, & McCull.), bacterial leaf spot. Md. (4); Ind., Iowa, Md., N.C., Va., Wis. (5).

Pseudoplea trifolii (Rostr.) Petr., leaf spot. Ill., Mo., N.Y. (5).

Pyrenopeziza sp., leaf spot. Md. (3).

Pythium sp., root rot. Wis.

Ramularia sp., leaf spot. Ga. (5).

Rhizoctonia sp., root rot. N.C.

Sclerotinia trifoliorum Eriks., Sclerotinia wilt, root rot. N.J. to S.C. and Tenn., also Oreg. (5).

Sclerotium rolfsii Sacc., southern blight, stem rot. La. (5).

Stemphylium sp., leaf spot. Va.

Thielaviopsis basicola (Berk. & Br.) Ferr., black root rot. Wis.

Uromyces minor Schroet. (I,III), rust. Calif., Oreg., Wash. (4,6); Okla., Tex. (6), probably also Ala., Ind., Miss. although reported as *U. trifolii* (Hedw. f.) Lév.

U. trifolii (Hedw. f.) Lév. var. *fallens* (Desm.) Arth. (O,I,II,III), rust. Del., S. Dak. Var. *trifolii-repentis* (Liro) Arth., Oreg., Wis. This species, without designation of variety, is also reported from Ala., Ind., Minn., Mo., and Pa.

Mosaic—virus(es). Conn., Ind., N.J., Pa., Va. Viruses infective by artificial inoculation to crimson clover (5) include those of yellow mosaic of bean, common and enation mosaic of pea, pea mottle, pea wilt, pea streak, alfalfa mosaic, and red clover veinal mosaic, also the cucumber mosaic and the potato yellow dwarf viruses. These viruses have not usually been differentiated in natural infections, but crimson clover has been shown to be a natural host of yellow bean mosaic in Oreg.

Mosaic—sugar beet mosaic (*Marmor betae* Holmes, Beta virus 2 K.M.Sm)—natural infection. Calif. (5).

II. Perennial Species, of European Origin (Except (1))

(1) *Trifolium carolinianum* Michx., Carolina clover.

Native in the Southeastern and Southern States west of Texas; furnishes food for wildlife.

(2) *T. hybridum* L., alsike clover.

Naturalized in the eastern United States; excellent meadow and pasture plant, similar to *T. repens* L. but larger and more upright; cultivated for forage and, mixed with grasses, for hay; good honey plant; of use to wildlife.

(3) *T. medium* L., zigzag clover.

Only occasionally cultivated; found in waste places of northeastern United States.

(4) *T. pratense* L., red clover.

Widely cultivated for hay and forage, and naturalized in agricultural areas throughout the United States. Several varieties, including *perenne* Host, are distinguished.

(5) *T. repens* L., white clover.

Cultivated in pastures and lawns, a prime honey plant, naturalized throughout the United States except on the arid plains. The Ladino variety, a robust type, is cultivated in the Northeast, the southern Piedmont, and the Pacific Northwest; furnishes food for wildlife.

Alternaria tenuis Auct., seed mold. Cosmopolitan. Secondary leaf spot—Vt. (3); Va. (4).

Ascochyta spp. (doubtfully reported as *A. pisi* Lib. and *A. imperfecta* Pk.; perhaps *A. trifolii* Bond. & Trusova = *Stagonospora recedens*, q.v.), leaf spot. Ill., Wash. (4). See also *Phoma*.

Ascochyta sp., leaf spot. Ill. (2); Maine, Mass., Vt. (5). See also *Stagonospora*.

Blennoria trifolii Bonar, on leaves with *Curvularia*, probably secondary. Md. (5).

Botrytis sp., gray-mold blight. Ala. (5).

B. anthophila Bond. (=*Sclerotinia spermophila* Noble), anther mold, also on seed. Oreg., Wash. (4).

B. cinerea Pers. ex Fr., gray-mold leaf blight, stem rot. N.Y., Pa. (4).

Cercospora zebrina Pass., leaf spot. N.Y. to Ala., La., and Wis. (2); N.Y., Vt. (3); Maine to Md., Mo., and Minn. (4); N.Y. to Ala., La., Utah, and Wis. (5).

Colletotrichum spp., anthracnose. Specific reports as follows: *C. destructivum* O'Gara—Utah (2); Ky., Minn., Utah (4); *C. graminicola* (Ces.) G.W.Wils. —Ky., Ohio (4); Ky. (5); *C. trifolii* Bain & Essary—General from N.J. to Ala., Tex., and Ill., occasionally reported north and west, in N.Y., Mich., Wis., Wash. (4); Va. to Ga., Tex., and Ill., also ?Maine, N.Y., Wash. (5).

Curvularia trifolii (Kauff.) Boed., leaf spot. Md., Va. (5).

Cuscuta spp. (especially *C. arvensis* Beyrich and *C. epithymum* Murr.), dodder. General in the Eastern and Central States and southward, rare in the West.

Cylindrocladium scoparium Morg., stem rot (?secondary). Tenn. (4).

Cymadothea trifolii (Pers. ex Fr.) Wolf, sooty blotch. General (2,5); Maine to N.C., Tex., and Wash. (4). Reputed to be the cause of "trifoliosis," or mouth ulcers, in animals grazing on infected plants.

Didymella trifolii (Fckl.) Sacc., on stems. Miss. (4).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. Calif., Idaho, Oreg., Utah, Wash. (4); Nev., N.Y. (5).
Erysiphe polygoni DC., powdery mildew. Vt. to S.C., Ill., Minn., and Pacific Northwest (2); Ky., N.Y., Vt. (3); general (4); widespread but infrequent—Vt. to Fla. and Mo., found in Pacific Northwest (5). Commonly found in conidial stage only; perithecial stage reported in Idaho, Mont., N.Y., Oreg., Wash., W. Va. Rare in the United States prior to about 1920.
Fusarium spp., root rot and crown rot following wounding (?secondary). Ind., Ky., Minn., N.Y., Ohio, Pa., Wis. (4). The following species have been identified: *?F. graminearum* Schwabe in Ohio; *F. moniliforme* Sheldon, *F. oxysporum* Schlecht., and *F. solani* (Mart.) Appel & Wr. in Ky., Pa., Wis. (4,5).
Fusarium sp., root rot. Ala. (2).
Gloeosporium trifolii Pk.: See *Sporonema trifolii.*
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
H. schachtii A.Schm., root nematode. Utah (5).
Hoplolaimus coronatus Cobb, root nematode. Md. (4).
Kabatiella caulivora (Kirchn.) Karak., northern anthracnose. Maine to Va., Mo., and Oreg. (4).
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. Ky. (4).
Macrosporium. See *Pleospora* and *Stemphylium.*
Meloidogyne spp., root knot nematodes. Occasional (2); reported Va. (3); La., S.C., Utah, Va., W. Va. (4); Ala., Calif., N.C., W. Va. (5).
Microsphaera alni DC. ex Wint., powdery mildew. N.Y. (4).
Olpidium (*?Urophlyctis*) *trifolii* (Pass.) Schroet., leaf curl. La. (5).
Orobanche minor J.E.Smith—On clover species. N.C., N.J., Va.
Peronospora trifoliorum d By., downy mildew. N.Y., Wyo. (4); Nebr. (5).
Phoma spp., leaf and stem spot, black stem. *P. medicaginis* Malb. & Roum. (=*?Ascochyta imperfecta* Pk.) reported from Idaho, and *P. trifolii* E.M. Johnson & Valleau from Ky. and Wis., but the precise position of these in the *Ascochyta-Phoma-Stagonospora* complex on Leguminosae is not yet determined. Black stem of undetermined cause is also reported from N.Y.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4,5).
Physarum cinereum Batsch ex Pers., slime mold. Ind., Md., Pa.
Pleospora herbarum (Pers. ex Fr.) Rabh. (*Stemphylium botryosum* Wallr.), seed mold, secondary leaf spot. Cosmopolitan.
Pratylenchus sp., root nematode. Oreg. (2).
P. pratensis (De Man) Filip., root nematode. Va.
Pseudomonas syringae Van Hall, bacterial leaf spot. N.Y. to N.C., Nebr., and Minn. (2,5); Iowa, N.C., Va., Wis. (3); N.Y. to N.C., Iowa, and Minn. (4).
Pseudopeziza trifolii (Biv.-Bern.) Fckl., leaf spot. N.Y., W. Va. (2); N.Y. (3); Maine to Md., Nebr., and the Pacific Northwest, also Calif. and Alaska (4); Calif., Mass., Miss., Mont., N.Y., Oreg., Vt. (5).
Pseudoplea trifolii (Rostr.) Petr., pepper spot, leaf scorch, leaf spot. Ala. (1); Ill., Mo., N.Y. (2); Ill., Kans., Mo., N.Y. (4); Northeastern States to La. and Wis. (5).
Rhizoctonia crocorum DC. ex Fr. (=*Helicobasidium purpureum* (Tul.) Pat.), violet root rot. Oreg. (4).
R. solani Kuehn, brown patch, root rot. Minn., Ohio (2); N.C. ("summer blight"), N.Y., Ohio, Wis., probably general in humid regions (5).
Sclerotinia trifoliorum Eriks., Sclerotinia wilt, stem canker, root rot. Mich., N.C., W. Va. (2); Oreg. (3); N.Y. to Miss., La., and Mich., also Oreg., Wash. (4); Ala., Kans., Ky., Miss., N.Y., Oreg., Pa. (5).
Sclerotium bataticola Taub.: See *Macrophomina phaseoli.*
S. rolfsii Sacc., southern blight. Ala.
Septoria trifolii Ell., on dead leaves. N.J. (4).
Sporonema trifolii (Pk.) Greene, leaf spot. Mich., N.Y., Ohio, Wis. (4).
Stagonospora meliloti (Lasch) Petr. (*S. dearnesii* Sacc.), leaf spot. Ala., Idaho, La., N.J., N.Y., Oreg., W. Va., Wis. (5); Mont., N.Y., Wis. (2). Conidial stage of *Leptosphaeria pratensis* Sacc. & Briard which has not yet been found on this host. Reports of leaf spot caused by *Aschochyta* sp. may belong here.
S. recedens (Massal.) F.R.Jones & Weimer, leaf spot. Calif., Iowa, Wis. (4). *S. meliloti* (Lasch) Petr., and its synonym *S. dearnessii* Sacc., as reported on this host in N.Y. and Wis., probably belong here; perhaps also some of the fungi reported as *Ascochyta* spp.
Stemphylium sarcinaeforme (Cav.) Wiltshire, leaf spot. Ind., N.Y., Vt. (2); Vt. (3); Maine to N.C., La., Kans., and N. Dak. (4).
Synchytrium sp, leaf gall. ?Tex. (1).
Thielaviopsis basicola (Berk. & Br.) Ferr., black root rot. Conn., Tex. (2,5); Conn., N.Y., N.C. (4).
Uromyces elegans (Berk.) Lagh. (I,III), rust. S.C. to Fla. and Tex. (1).
U. nerviphilus (Grognot) Hotson (O,I,III). rust. Colo., Mich., Mont., Nev., N.Y., Wash., Wis. (5).
U. trifolii (Hedw. f.) Lév. var. *fallens* (Desm.) Arth. (O,I,II,III), rust. Ind., Md., Nebr., N.Y., S. Dak. (3); general (4).
U. trifolii var. *hybridi* (W.H.Davis) Arth. (O,I rare, II,III), rust. Colo., Mich., Mont., Nev., N.Y., Wash., Wis. (2).
U. trifolii var. *trifolii-repentis* (Liro) Arth. (O,I,II, III), rust. Maine to N.C., Mo., and Tex.; Calif. and Pacific Northwest (5).
Urophlyctis trifolii (Pass.) Magn., leaf gall. La., Md., S.C.
Mosaic—virus(es). Widely distributed but infrequent. White clover mosaic, formerly attributed to a specific virus, Trifolium virus 1 K.M.Sm., is now known to be due sometimes, and perhaps generally, to joint action of two viruses, pea mottle virus (*Marmor efficiens* F. Johnson), and pea wilt virus (*M. repens* F. Johnson); natural infection with both viruses, singly or together, occurs in red clover also, and alsike clover has been infected experimentally.

The pea mosaic virus (*M. leguminosarum* Holmes, Pisum virus 2 K.M.Sm.), is probably the most common cause of mosaic in red clover and occurs naturally in alsike clover; artificial infection of Carolina clover has been obtained.

A mosaic of alsike clover is attributed to a specific virus, alsike clover mosaic virus (*Marmor fastidiens* Holmes), similar to yellow mosaic virus of beans, with several strains, some infective to red clover, some not.

Viruses infective to red and white clovers but not differentiated in natural infections include: alfalfa mosaic virus (*Marmor medicaginis* Holmes, Medicago virus 1 K.M.Sm.), the potato calico strain (*M. medicaginis* var. *solani* Black & Price (in 4)), bean yellow mosaic virus (Phaseolus virus 2 K.M.Sm.), and pea streak virus (Pisum virus 5 Zaumeyer ex Weiss).

See also Veinal Mosaic and Yellow Patch.
Ring spot—?tobacco ring spot virus (*Annulus tabaci* Holmes, *Marmor annularium* McK., Nicotiana virus 12 K.M.Sm.). Ky., natural infection with yellow

strain in red clover. Artificial infection of white clover has also been obtained.

TOBACCO STREAK—virus (*Annulus orae* Holmes, *Tractus orae* Valleau, Nicotiana virus 8 K.M.Sm.). Natural infection of (5) in Wis.

VEINAL MOSAIC—red clover vein mosaic virus (*Marmor trifolii* Holmes). Ill., N.J. (4). Experimentally transmitted to (2,5).

WITCHES'-BROOM—virus. Wash. (5).

YELLOW DWARF—potato yellow dwarf virus (*Aureogenus vastans* (Holmes) Black, Solanum virus 16 K.M.Sm.). N.Y. (4). Red clover is a natural overwintering host and an important food plant of the vector; the virus causes symptoms suggestive of a mosaic disease. Experimental infection has been obtained in (2,3,5).

YELLOW PATCH—virus (*Marmor medicaginis* var. *ladino* Kreitlow & Price). Maine to N.J. and Ind., also Oreg., ?Ky. (5).

BLACK PATCH—sterile fungus. Wis. (5).

BLACK STEM. SEE *Phoma*.

GIRDLE—stem canker of undetermined cause. N.Y., ?Idaho (4); found in Mo.

PSEUDO-MOSAIC—genetic abnormality causing variegation. Pa. (5).

WHITE SPOT—physiological, perhaps calcium deficiency. Va. (2); Ill., N.J. (4).

YELLOWS—in part physiological, probably potassium deficiency. Ark., Conn., Ill., N.J. (4). In part due to leafhopper injury—N.J., Va., Wis. (4).

III. Miscellaneous Native Species

(1) *Trifolium fendleri* Greene, Fendler clover.
(2) *T. parryi* A.Gray, Parry clover.
(3) *T. rydbergii* Greene, Rydberg clover.
(4) *T. variegatum* Nutt., white-tip clover.
(5) *T. wormskjoldii* Lehm., Sierra clover.
(6) Other species.

Annual or perennial species, occurring chiefly in the mountain areas of the Western States, in alpine meadows, or in open or wooded uplands; afford limited grazing for livestock and wildlife.

Cymadothea trifolii (Pers. ex Fr.) Wolf, sooty blotch. Nev., N.Mex. (1); N.Mex. (3); Calif., Oreg. (5); Calif., N. Dak. (6).

Erysiphe polygoni DC., powdery mildew. Utah (3); Mont. (4); Colo., Oreg. (5), Idaho, Oreg., Wash. (6).

Leptosphaeria monticola Ell. & Ev., on leaves and stems. On *T. kingii* S. Wats. in Colo.

Pleospora herbarum (Pers. ex Fr.) Rab., on leaves. N. Mex. (6).

Thecaphora deformans Dur. & Mont., seed smut. On *T. tridentatum* Lindl. in Calif.

Uromyces minor Schroet. (O,I,III), rust. Colo., Nev. (1); Colo., Utah, Wyo. (2); Colo., Mont. (3); Calif., Nev., Wash. (4); Calif. (5); Calif., Oreg., Utah, Wash., Wyo. (6).

Trigonella

T. foenum-graecum L., fenugreek.

Annual herb of Mediterranean region, used for forage and livestock food; grown as a cover crop and winter green-manure crop (in southern California); seeds used in veterinary medicine.

Entyloma trigonellae Stevenson, leaf smut. Calif.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Calif.

Vicia, vetch, tare

I. Annual Species (Herbs of European Origin)

(1) *Vicia angustifolia* L., narrowleaf vetch.

Sometimes grown for winter cover and soil improvement in the South and widely established in fields and waste ground; of use to wildlife.

(2) *V. atropurpurea* Desf., purple vetch.

Grown for hay, forage, and soil improvement, chiefly in the Pacific Coast States and the Far South.

(3) *V. faba* L., broadbean, horsebean.

From the Mediterranean region, cultivated since antiquity for edible seeds; in the United States grown in California and occasionally elsewhere as a garden crop and in the South as a winter annual for soil improvement and livestock feed.

(4) *V. pannonica* Crantz, Hungarian vetch.

Grown for hay, forage, and soil improvement, chiefly in the Pacific Coast States and the Far South.

(5) *V. sativa* L., common vetch.

Commonly grown for forage and winter cover in the South and for hay and seed in the Pacific Coast States; of use to wildlife.

(6) *V. villosa* Roth, hairy vetch, winter vetch.

Grown for hay, forage, and soil improvement; hardy in the Northern States.

Alternaria tenuis Auct., secondary leaf and stem spot, also on seed. Calif., Idaho (3).

Aphanomyces euteiches Drechs., root rot. Ala., Wis. (5).

Ascochyta sp., leaf and pod spot. Mich. (5); on (6) throughout its range; foot rot—Ala. (5). Sometimes identified as *A. pisi* Lib. (*A. viciae* Lib.) but is probably the conidial stage of *Mycosphaerella pinodes*. Besides *A. pisi* and *M. pinodes*, which are reported as naturally infecting this host, *A. pinodella* L. K. Jones can infect it by artificial inoculation.

A. pisi Lib. (*A. viciae* Lib.), leaf spot. Ga., Miss., N.C., S.C., Wis. (1); Calif., La., Ohio (3); Del., Ga., Miss., N.C., N.Y., Oreg. (5).

Botrytis cinerea Pers. ex Fr., gray-mold leaf spot. Fla., Ga. (1,5); Fla., Ga., N.Y., Alaska (3); N.Y. (?).

Cercospora viciae Ell. & Holw., leaf spot. Iowa, Kans., Md. (5).

Colletotrichum viciae Dearn. & Overh., anthracnose. Wis. (1); La., Md., Miss., Pa., Wis. (6).

C. villosum Weimer, anthracnose. Fla., Ga. (1,5), perhaps also La. (5); Fla., Ga. (2,4,6); Okla. (6).

Erysiphe polygoni DC., powdery mildew. Tex.

Fusarium culmorum (W.G.Sm.) Sacc. and *F. trichothecioides* Wr., root rot. Utah (3).

F. oxysporum Schlecht. f. *medicaginis* (Weimer) Snyd. & Hans., wilt, root rot. Ala., Miss. (5); Miss. (?).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Kabatiella nigricans (Atk. & Edg.) Karak., false anthracnose, stem and pod spot. La., Va. (1); Ga. (2); Oreg. (4); La., N.C., N.Y. (5); Ga., La., Miss., Mont., N.C., N.Y., Ohio, Oreg., S.C., Tenn., Wis. (6).

Meloidogyne spp., root knot nematodes. Calif., Gulf

States (2); Calif. (3); Calif., Tex. (5); Calif., Gulf States, R.I. (6).

Mycosphaerella sp., leaf spot. La. (3).

M. pinodes (Berk. & Blox.) Vest., leaf and stem spot. Wis. (1); Oreg. (4); N.Y. (5); Ga., N.Y., S.C., Wash. (6).

Ovularia schwarziana Magn., leaf and stem spot. Wash. (2,5); Calif., Idaho, Oreg. (6). Apparently the same fungus is reported as *O. viciae* (Frank) Sacc., on (2) in Wash.

Peronospora mayorii Gäum., downy mildew. Md. (1). Perhaps only a form of the following.

P. viciae (Berk.) Casp. Ga., Md., N.C. (1); Mass., Md., Miss., Oreg., Tex., Va. (5); Miss., N.C., S.C. (6). Also reported as *P. viciae-sativae* Gäum. on (5).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,3,5).

Pleosphaerulina hyalospora (Ell. & Ev.) Berl., leaf spot. Miss. (5).

Pratylenchus sp., root nematode. Oreg. (6).

Pseudomonas pisi Sackett, bacterial blight. Calif. (2).

Pseudopeziza ?medicaginis (Lib.) Sacc., leaf spot. Miss. (6).

Pythium spp., root rot, damping-off. Calif., T.H. (3). The following specifically identified: *P. arrhenomanes* Drechs., *P. debaryanum* Hesse, *P. graminicola* Subr., *P. irregulare* Buis., *P. rostratum* Butl., *P. splendens* Braun.

Rhizoctonia solani Kuehn, root and stem rot. Mich., Wash. (3); ?Ill.

Sclerotinia sp., stem rot. Calif. (6).

S. sclerotiorum (Lib.) d By., stem rot. Calif. (3).

S. trifoliorum Eriks., wilt, stem rot. Oreg. (2); Calif., Oreg. (5).

Sclerotium rolfsii Sacc., southern blight. Fla., P.R. (3).

Septoria pisi West., leaf spot. Ga. (6).

S. viciae West., scald, stem rot. Oreg. (4,5).

Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Mass.

Uromyces fabae (Pers.) d By. (O,I,II,III), rust. Ala., Calif., Kans., La., Miss., N.C., Pa., Tex. (3); Calif., Mass., Mont., Wash. (5).

?Xanthomonas phaseoli (E.F.Sm.) Dows., bacterial blight. La. (3).

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (3).

MOSAIC—virus(es). Calif., Ind., La., N.J., Va. (3). The following viruses have been identified in natural infections: *Marmor pisi* Holmes and *M. trifolii* Holmes in N.J.; *M. efficiens* F.Johnson and *?M. repens* F.Johnson in Wash. Susceptibility to artificial inoculation by the following viruses has been shown: alfalfa mosaic, common and yellow bean mosaic, common pea mosaic, pea streak, and cucumber mosaic including the lima bean strain.

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., T.H. (3).

II. Native Perennial Species

(1) *Vicia americana* Muhl., American vetch, including the var. *oregana* (Nutt.) A.Nels. and var. *truncata* (Nutt.) Brewer.

(2) *V. caroliniana* Walt., Carolina vetch, wood vetch.

(3) *V. cracca* L., cow vetch, tufted vetch, Canada-pea.

(4) *V. sparsifolia* Nutt., stiffleaf vetch.

Native perennial herbs which are widely distributed: (1) more frequent in the East and North, (2) mostly in the South, and (3) West. All are important food plants for wildlife.

Ascochyta pisi Lib., leaf spot. Calif. (1), Wis. (1,2), Oreg. (4). Reported also as *A. viciae* Lib., which is generally regarded as a synonym; the identification as *A. pisi* on native vetches has been questioned but is tentatively accepted because of its demonstrated pathogenicity to cultivated species of vetch. SEE ALSO *Mycosphaerella pinodes*.

Cercospora viciae Ell. & Holw., leaf spot. Mich., Wis. (2).

Erysiphe polygoni DC., powdery mildew. Mo., Mont. (1); Mont., Oreg. (4).

Gloeosporium davisii Ell. & Ev., on pods. Wis. (1).

G. everhartii Sacc. & Syd., on leaves. Wis. (1).

Microdiplodia viciae Pk., on leaves. Kans., N. Mex. (1); Calif., Kans. (4).

Microsphaera alni DC. ex Wint., powdery mildew. Idaho, Ill., Mont., Oreg., N. Dak., S. Dak., Wyo., Wash. (1); Mont. (4). Var. *ludens* Salm.—Oreg., S. Dak., Wyo. (1); Colo., Mont., S. Dak., Wyo. (4). Var. *vaccinii* (Schw.) Salm.—Wash. (1); Wyo. (3).

M. diffusa Cke. & Pk.—Mont., S. Dak., Wyo. (1).

Mycosphaerella pinodes (Berk. & Blox.) Vest., on stems. N.Y. (1,2). This report may refer to the pycnidial stage only and actually be *Ascochyta pisi* Lib.

Peronospora narbonensis Gäum., downy mildew. Colo., Iowa, Kans. (1). The fungi reported variously on this host as *P. viciae* (Berk.) Casp., *P. viciae-americanae* J. J. Davis, and *P. viciae-sativae* Gäum. in N. Dak., S. Dak., and Wis. are probably identical. It is at least physiologically distinct from *P. viciae* on cultivated species of vetch.

Phleospora reticulata Ell. & Ev., on leaves. Wis. (1).

Septoria astragali Desm., leaf spot. Wis. (1).

Sphaerotheca humuli (DC.) Burr., powdery mildew. Wash. (species not designated).

Thecaphora deformans Dur. & Mont., seed smut. Utah (1,3), N.Y. (2).

Uromyces coloradensis Ell. & Ev. (O,I,III), rust. Ind. and Wis. to N. Mex., Calif., and Wash. (1,4); Wis. (2); Utah, Wyo. (3). Three varieties are distinguished by Arthur: *campester*, ranging from Ind. to N. Mex. and Mont.; *montanus*, from Colo. and Mont. to Wash.; *maritimus*, on the Pacific coast.

U. fabae (Pers.) d By. (O,I,II,III), rust. General (1); Wis. (2), Conn., Vt. (3); Minn. to Ariz. and Oreg. (4).

Vigna

(1) *V. cylindrica* (L.) Skeels (*V. catjang* Walp.), catjang-pea.

(2) *V. sesquipedalis* (L.) Fruwirth, asparagus-bean, yardlongbean.

(3) *V. sinensis* (Torner) Savi, cowpea, black-eyed pea.

Annual herbs, probably originally of eastern Asia, widely cultivated for forage, soil improvement, and edible seeds, (2) as a garden novelty. Various types of (3) are grown in the United States, chiefly in the South. These intergrade with (1) and to some extent with (2).

Alternaria sp., *A. atrans* Gibson (probably = *A. tenuis* Auct.), secondary leaf spot, tipburn. Ariz., Del., Ill. (3).

Aristastoma oeconomicum (Ell. & Tracy) Tehon, late, or white, leaf spot. Miss. (1); Conn. to Fla., Tex., and Ill. (3).

Ascochyta spp., leaf and pod spot. Del., Md., Tex. (3). *A. pisi* Lib. reported in Tex.; *A. phaseolorum* Sacc. (?) in Md.

Botrytis cinerea Pers. ex Fr., gray-mold blight, pod rot. Calif., Del., Md., N.J. (3).
Cercospora canescens Ell. & G. Martin, leaf spot. Miss., Va., W. Va. (3). Sometimes considered a synonym of *C. cruenta.*
C. cruenta Sacc. (=*Mycosphaerella cruenta* Latham), leaf spot. Ark., Del., Fla., La., Tenn. (1); Va. (2); N.J. to Fla., Tex., and Kans. (3).
C. vignae Ell. & Ev.: SEE *C. cruenta.*
C. vignae Rac.: = *C. vignae-sinensis* Tai. Has been reported on cowpea in P.R., but the applicability of this name to American material is doubtful.
C. vignicaulis Tehon, on stems. Ill. (3). Associated with *Glomerella vignicaulis* Tehon.
Chaetoseptoria vignae Tehon, leaf spot. Ill. (3).
Choanephora cucurbitarum (Berk. & Rav.) Thaxt., pod rot. Ga., La., Miss., N.C. (3).
Cladosporium vignae Gardner, leaf and pod spot. Ind. (2); Del. to Ala., Ind., Calif., and Tex. (3).
Colletotrichum spp., anthracnose. Occasional (3). Identified as *C. caulicola* Heald & Wolf (=*C. truncatum* (Schw.) Andrus & W. D. Moore) in La.; as *C. lindemuthianum* (Sacc. & Magn.) Briosi & Cav. in Ala., Del., Fla., Ill., and Okla. SEE ALSO *Glomerella cingulata.*
Corticium koleroga (Cke.) Hoehn.: SEE *Pellicularia koleroga.*
C. microsclerotia Weber and *C. solani* (Prill. & Del.) Bourd. & Galz. SEE *Pellicularia filamentosa.*
Diaporthe phaseolorum (Cke. & Ell.) Sacc. var. *sojae* (Lehman) Wehm., on stems. Ga., Md., Va. (3).
Diplodia natalensis P.Evans (=*Physalospora rhodina* (Berk. & Curt.) Cke.), on stems and pods, ?dieback. Tex. (3).
Erysiphe polygoni DC., powdery mildew. Calif. (2); Conn. to Fla., Kans., Tex., and Calif. (3).
Fusarium oxysporum Schlecht. f. *tracheiphilum* (E.F. Sm.) Snyd. & Hans., wilt. General in the Southern States from Va. to Fla., Mo., and Tex. but largely controlled by use of resistant varieties. Possibly other forms of *F. oxysporum,* as f. *vasinfectum* (E.F.Sm.) Snyd. & Hans. (formerly confused with *Neocosmospora vasinfecta* E.F.Sm.), also are involved.
F. solani (Mart.) Appel & Wr. f. *phaseoli* (Burk.) Snyd. & Hans., root rot. Calif., Miss., N.Y., Okla.
Glomerella cingulata (Ston.) Spauld. & Schrenk, ?secondary stem canker. Ga. *Colletotrichum* sp. (with curved spores) also present but not pathogenic.
G. vignicaulis Tehon, on stems, ?stem blight. Ill., ?La. (3). Associated with *Cercospora vignicaulis.*
Helminthosporium vignae L.S.Olive (=*H. vignicola* (E. Kawamura) Olive), target spot. Fla., Ga., La., N.C., S.C. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Leptosphaerulina vignae Tehon & Stout, leaf spot. Ill. (3).
Macrophoma subconica Ell. & Ev., stem canker. Ala., Ill. (3).
Macrophomina phaseoli (Maubl.) Ashby, ashy stem blight, charcoal rot. Ark., Calif., Ga., Ill., Md., N.C., Okla., Tex. (3).
Meloidogyne spp., root knot nematodes. On (3). General in the South from Va. to Fla. and west to Calif., but usually avoided by growing resistant varieties (Iron and Brabham are nearly immune); reported on this host also in R.I. and T.H.
Microsphaera alni DC. ex Wint., powdery mildew. Fla., Ga., Ind., S.C. (3).
Mycosphaerella cruenta Latham: SEE *Cercospora cruenta.*
Mycosphaerella pinodes (Berk. & Blox.) Vest., leaf spot. S.C. (3).
Myrothecium roridum Tode ex Fr., leaf spot. La., Miss. (3).
Nematospora phaseoli Wingard (*?N. coryli* Pegl.), yeast spot of seed. Ill., Va. (3).
Pellicularia filamentosa (Pat.) Rogers (*Rhizoctonia solani* Kuehn), stem canker. General (3). Also reported as *C. microsclerotia* Weber, web blight, in Fla.
P. koleroga Cke. (*Corticium stevensii* Burt), leaf blight. N.C. Reported as *Hypochnus ochroleucus* Noack.
Peronospora trifoliorum d By., downy mildew. N.J., Va. (3).
Phoma bakeriana Sacc., pod spot. Miss. (3). Perhaps the same fungus is reported as *P. lathyrina* Sacc. from Ill., and both may be forms of the following.
Phyllosticta phaseolina Sacc., leaf spot. Del. to S.C., Okla., Iowa, and Mich. (3). Perhaps secondary to bacterial spot.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz. (1); Okla., Tex. (3).
Phytophthora cactorum (Leb. & Cohn) Schroet., red stem canker. Ga.
Pratylenchus brachyurus (Godfrey) Goodey, root nematode. T.H.
Pseudomonas phaseolicola (Burkh.) Dows., bacterial spot, ?halo blight. Ga. (3). Not clearly differentiated from the bacterial spots caused by *P. syringae* and *Xanthomonas vignicola;* perhaps doubtful, as is also *P. pisi* Sackett reported on this host in Tex.
P. syringae Van Hall, bacterial spot, red spot. Ind., N.Y. (2); Conn. to Fla., Tex., and Kans. (3).
P. tabaci (Wolf & Foster) F.L.Stevens, wildfire. Fla., N.C. (3).
Pythium spp., root rot, damping-off. Ariz., Calif., T.H. (3). The following species identified: *P. artorogus* (Mont.) d By. — T.H.; *P. debaryanum* Hesse — Calif., T.H.; *P. splendens* Braun — T.H.; *P. ultimum* Trow—Calif.
Rhizobium japonicum (Kirchner) Buchanan, or some other strain of the *R. leguminosarum* groups, bacterial nodule. Widespread in soils where cowpeas are grown (1,3).
Rhizoctonia spp., stem canker, sore shin, leaf blight. For *R. microsclerotia* Matz, *R. solani* Kuehn, and *?R. dimorpha* Matz: SEE *Pellicularia filamentosa.*
Rotylenchulus reniformis Linford & Oliveira, root nematode. T.H. (1).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Tex. (3).
Sclerotium bataticola Taub: SEE *Macrophomina phaseoli.*
S. rolfsii Sacc., southern blight. Gulf States, Ill., N.C., Tex. (3).
Septoria melanophthalmi Berk. & Curt., ?leaf spot. N.C. (3).
Stagonospora phaseoli Dearn. & Barth., leaf spot. Tex. (3).
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Md. (3).
Uromyces phaseoli (Pers.) Wint. var. *vignae* (Barcl.) Arth. (O,I,II,III), rust. T.H. (1,2); widespread (3); reported from Md. to Fla., Tex., and Kans., also Calif., but occurs mostly on Blackeye and related varieties; most cowpea varieties in the U. S. are immune.
Verticillium albo-atrum Reinke & Berth., wilt. Calif. (3).
Xanthomonas vignicola Burkh., bacterial blight. Tex. (3). Reports of *X. phaseoli* (E.F.Sm.) Dows. on cowpeas in Ala., Ill., Miss., and Okla., probably relate to this organism since *X. phaseoli* is not pathogenic to *Vigna.*
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (3).

MOSAIC—virus(es) (*?Marmor cucumeris* var. *vignae* Holmes, in part). Ind. (1); N.J. to Ala., Tex., and Kans., also Calif. and P.R. (3). The virus to which this name was applied originated as a mutant strain or segregate from cucumber mosaic virus; the naturally occurring cowpea mosaic virus is not known to be identical but has similar properties. Several other viruses are artificially communicable to cowpea, but cause local lesions (necrotic spots), as alfalfa mosaic including the potato calico strain, most strains of cucumber mosaic including the lima bean strain, pea wilt, and tobacco ring spot. In La. three viruses were distinguished as Vigna virus 1 (2,3, and 3A) Warid & Plakidas.

MOSAIC—unidentified seedborne virus. Calif. (2).

BLACK PATCH—sterile fungus. Ga. (3).

CHLOROSIS—nutrient deficiency, especially manganese and perhaps other mineral nutrients. Ala., Tex.

LEAF BRONZING, CHLOROTIC SPOTTING, MARGINAL YELLOWING AND BURNING — nutrient deficiency, chiefly of potassium. On acid soils in the Southern States.

Wistaria (Wisteria)

Wistaria spp., chiefly *W. floribunda* (Willd.) DC., Japanese wistaria, *W. frutescens* (L.) Poir., American wistaria, and *W. sinensis* (Sims) Sweet, Chinese wistaria.

Woody vines or twining shrubs, cultivated for ornament, *W. floribunda* hardy in zone 4, *W. frutescens* grown in zone 8 and 9, and *W. sinensis* hardy in 5.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Conn., Md.

Botryosphaeria wistariae (Rehm) Sacc., on stems. S.C. (*?Physalospora obtusa*).

Camarosporium wistarianum Fairm., on stems. N.Y.

Cytoploea subconcava (Schw.) Starb., on dead stems. Pa.

Erysiphe sp. (*?cichoracearum* DC.), powdery mildew. Tex.

Haplosporella wistariae Ell. & Barth., on stems. Kans., N.Y.

Hendersonia wistariae Cke., on stems. S.C.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Meloidogyne spp., root knot nematodes.

Mycosphaerella sp., on leaves. S.C.

Nectria cinnabarina Tode ex Fr., on stems, ?canker. Conn.

Phomatospora wistariae Ell. & Ev. On *W. frutescens*, Ill.

Phomopsis sepositа (Sacc.) Trav., on stems. Mass. (Probably related to *Diaporthe eres* Nits.)

Phyllosticta wistariae Sacc., leaf spot. Mass., Mo., N.J., Tex.; on *W. frutescens*, Tex.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Physalospora obtusa (Schw.) Cke., on stems. N.Y., S.C.

Pleurotus sp., heart rot. W. Va.

Septoria wistariae Tharp, leaf spot. Tex.; on *W. frutescens*, Tex. (*S. wistariae* Brun., in Europe, has priority).

MOSAIC—?virus. Miss., N.Y.

Zornia

Zornia spp., including *Z. diphylla* (L.) Pers. and *Z. bracteata* (Walt.) Gmel.

Prostrate, wiry-stemmed perennial herbs of warm latitudes, especially the American tropics.

Parodiella perisporioides (Berk. & Curt.) Speg.—P.R.

Puccinia offuscata Arth.—Fla., Cuba, P.R.

LILIACEAE

Agave,[7] American aloe

(1) *A. americana* L., centuryplant.
(2) *A. sisalana* Perrine, sisal hemp.
(3) Other species.

Robust perennial herbs, mostly of arid, warm regions in Mexico and Central America, some in southern California to Texas: (1) is widely grown as a decorative plant; (2) and several others are important fiber plants; various food and utilitarian articles are obtained from other species not commercially cultivated in the United States, but sometimes grown for novelty in the Far South, California, and Hawaii.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Occasional on (1) following overwatering or chilling.

Colletotrichum agaves Cav.: SEE *Glomerella cingulata*.

Coniothyrium concentricum (Desm.) Sacc. (*C. concentricum* var. *agaves* Sacc., *C. agaves* (Dur. & Mont.) Sacc.), leaf spot (?secondary). Common on (1); occasional on (3).

Diplodia theobromae (Pat.) Nowell, leaf rot. P.R. (3). Conidial stage of *Physalospora rhodina* (Berk. & Curt.) Cke.

Dothidella parryi (Farl. ex Cke.) Th. & Syd., leaf spot, black patch. P.R. (2); Calif. (3).

Exosporium sp., leaf spot. Tex. (3).

Gloeosporium agaves Syd.: SEE *Glomerella cingulata*.

Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, black rot. Occasional (1,2,3) following mechanical injury. Reported in the conidial stage as *Gloeosporium* (*Colletotrichum*) *agaves*.

Lembosia agaves Earle, black mildew. P.R. (3).

Melanconium americanum Pk. & G.W.Clint., on leaves. N.Y. (1).

Stagonospora gigantea Heald & Wolf, leaf spot, blight. Tex. (1); N. Mex. (3); Calif. (species not designated).

Aletris, colicroot, stargrass

(1) *A. aurea* Walt.
(2) *A. farinosa* L., unicornroot.

Perennial herbs: (1) of the southeastern States, (2) ranging from Maine to Minnesota, Florida, and Texas; sometimes grown in wild gardens.

Gloeosporium aletridis P.Henn., leaf spot. Miss.

Puccinia aletridis Berk. & Curt. (II,III), rust. Fla., Miss., S.C., Tex. (1); Del., Ill., Ind., Mass., N.C., N.J., R.I., Tenn., Wis. (2). O and I unknown.

Allium, onion

I. Vegetable and Garden Species, Except the Common Onion

(1) *Allium ascalonicum* L., shallot.

[7] Sometimes referred to the Amaryllidaceae.

(2) *A. porrum* L., leek.
(3) *A. sativum* L., garlic.
(4) *A. schoenoprasum* L., chives.

Biennial or perennial pungent herbs of Europe and Asia, grown in gardens for edible stems and leaves used for seasoning. Field culture of garlic chiefly in Louisiana and Texas; bulblets for propagation, "cloves," are produced in California and the Pacific Northwest. The plant grown as shallot in Louisiana and Texas may be a form of *A. cepa* L. but is commonly reported under *A. ascalonicum.*

Alternaria porri (Ell.) Cif., purple blotch. La., Tex., P.R. (1); Conn., La., N.J., N.Y. (2); Idaho, La., Tex. (3).
Aspergillus alliaceus Thom & Church—Tex. (3).
A. niger v. Tiegh., black mold. Calif., Ohio, Tex. (3); occasional in markets.
Botrytis allii Munn, gray-mold neck rot. La. (1); N.J. (2); Calif., La., Tex. (3).
Colletotrichum circinans (Berk.) Vogl., smudge. Ill., La., Wis. (1); Ill., Wis. (2).
Cuscuta sp., dodder. Wis. (3).
Diplodia natalensis P.Evans, dry rot. Tex. (3).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. Calif. (3).
Erwinia carotovora (L.R.Jones) Holland, soft rot. Ga. (2); Ga., La., Tex. (3).
Fusarium sp., wilt. N.J. (2); dry rot—Tex., occasional in markets (3).
F. oxysporum Schlecht. f. *cepae* (Hanz.) Snyd. & Hans., bulb rot. Idaho (3).
F. solani (Mart.) Appel & Wr. (*F. malli* Taub.), pink root (secondary). Tex. (1); Conn., Tex. (3).
Helminthosporium allii Campanile, canker, dry rot. La., N. Mex., Tex. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Heterosporium allii Ell. & G.Martin var. *allii-porrii* Sacc. & Berl., on leaves. Pa. (2).
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. Tex. (3).
Meloidogyne spp., root knot nematodes. ?Fla., Tex. (1); ?Fla. (2).
Penicillium sp., blue-mold rot. Calif., Tex. (3); occasional in markets.
Peronospora destructor (Berk.) Casp., downy mildew. La. (1); Calif., ?Conn., La. (2); Calif. (4).
Puccinia porri (Sow.) Wint. (II,III), rust. Calif. (3); Conn., N.Y., Wash. (4). O and I occur on cultivated *Allium* spp. but have not been found in America.
Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, pink root. Colo., La., Tex. (1); La., N. Mex., N.Y. (2); Calif., Colo., Conn., La., N. Mex., Tex. (3).
Sclerotium cepivorum Berk., white rot. La., Va. (1); Oreg., Va. (2); Calif., La., Oreg., Tex. (3). This has been published as *Stromatinia cepivorum* (Berk.) Whet. although no apothecial stage has been observed.
S. rolfsii Sacc., southern blight. La. (1); Ga., La., Tex. (3).
Stemphylium botryosum Wallr. (*?Macrosporium sarcinula* Berk.), black stalk rot, tip blight, seed mold. Conn., N.J., Wash. (2); Ark., Calif., La., N.H., Tex., Wash. (3).
Trichoderma viride Pers. ex Fr., green-mold rot. Tex. (3).
Urocystis cepulae Frost, smut. Mass. (1); Mass., N.Y. (2) (resistant); Mass., N.Y. (3); Mass. (4).
MOSAIC—unidentified virus(es). La., Tex. (1); Calif., Oreg., Tex., probably general (3); on *A. ampeloprasum* L., Spanish garlic, in La. and Oreg. These viruses resemble onion yellow-dwarf virus (*Marmor cepae* Holmes, Allium virus 1 K.M.Sm.) but may be special strains.
YELLOWS (yellow chlorosis, stripe) — suspected virus different from yellow dwarf, perhaps aster yellows. La., Tex. (1,3). Aster yellows confirmed in La.
BLAST (inflorescence blight, failure to form seed or bulblets) — cause unknown, attributed to weather factors; sometimes associated with root rot. Conn., Idaho (3).
WAXY BREAKDOWN — cause unknown, presumed physiological. Frequent in markets.

II. Vegetable Species, Common Onion and Welsh Onion

(1) *Allium cepa* L., onion

Biennial herb of southwestern Asia, universally cultivated for food. The principal commercial production areas in the United States are: Texas, Louisiana, Oklahoma, and California for spring (green) onions; New Jersey for intermediate season; New York, Michigan and other North Central States, California, Colorado, and the Pacific Northwest for late-summer (storage) onions.

(2) *A. cepa* var. *solaninum* Alef., potato, or multiplier, onion.
(3) *A. cepa* var. *viviparum* Metz, top onion.

Botanical varieties of the onion.

(4) *A. fistulosum* L., Welsh onion, or Spanish onion.

Species cultivated for its leaves, useful in seasoning. It is also used in onion breeding.

Acrothecium melanopus (Schw.) Sacc., on stalks. Pa. Perhaps a *Curvularia.*
Alternaria porri (Ell.) Cif. (*A. allii* Nolla), purple blotch. Maine to Miss., Tex., and Minn., also Colo., Utah, P.R. (1); Md. (4). Reported to cause bulb rot in Colo.; usually associated with and perhaps a significant factor in "blight," as reported in Tex. The *Alternaria* combination has been made by several authors, this appears to be the earliest.
A. tenuis Auct., secondary leaf and seed mold. General (1).
Aspergillus alliaceus Thom & Church—Tex. (1).
A. niger v. Tiegh., black-mold rot. General in markets and storage, especially in Tex. and Calif., associated with immaturity and wet weather (1).
Botrytis spp., neck rot, gray-mold rot, leaf blight. Three forms caused by different species have been distinguished but reports often fail to discriminate among them; available records indicate the following distribution: *B. allii* Munn, gray-mold neck rot. N.H. to Fla., Tex., and Minn., also Calif., Colo., Idaho, Oreg., Wash. (1). *B. byssoidea* J.C. Walker, probably a physiologic race of *B. allii,* mycelial neck rot. Conn., Idaho, Ill., Ind., Mass., N.Y., Wis. (2). *B. cinerea* Pers. ex Fr., gray-mold blight of foliage. Calif., La., Fla., and Wash.; perhaps confused with preceding species in some instances. *B. squamosa* Walker, small sclerotial neck rot. Fla., Idaho, Ill., Ind., La., Maine, Mass., N.Y., Ohio, Tex., Wis. (3).
Cercospora sp., leaf spot (?secondary). Tex. (1).
Colletotrichum chardonianum Nolla, leaf spot. P.R. (1).
C. circinans (Berk.) Vogl., smudge. General in the Eastern and Central States to Fla., Tex., and Colo., also Wash. (1).

Curvularia lunata (Wakker) Boed., on leaves. Calif. (1).

Cuscuta spp., dodder. Calif., Del., Idaho, Ill., N.Y., Tex., Wash., Wis. (1).

C. gronovii Willd.—N.Y. (1).

Diplodia natalensis P.Evans, Diplodia dry rot, superficial scale blemish. Tex., P.R. (1). Conidial stage of *Physalospora rhodina* (Berk. & Curt.) Cke.

Ditylenchus dipsaci (Kuehn) Filip., bloat, bulb nematode. N.Y., Tex. (1).

Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. Reported widespread in fields, transit, and storage, following bruises, sunscald, and frost damage (1). Probably more or less confused with *Pseudomonas alliicola*, q. v.

Fusarium spp., root rot, basal bulb rot (in field and storage). Eastern and North Central States and westward, especially in the irrigated districts of Colo., Calif., and Wash. (1). Numerous forms, all referable to *F. oxysporum* Schlecht. in the sense of Snyder & Hansen, may cause one aspect or another of this disease. In this classification the predominant forms are identified as *F. oxysporum* f. *cepae* (Hanz.) Snyd. & Hans. In other classifications they are distinguished as *F. zonatum* (Sherb.) Wr. f. 1 and f. 2 Link & Bailey (=*F. vasinfectum* Atk. var. *zonatum* f. 1 and f. 2) and *F. cepae* Hanz. (=*F. oxysporum* f. 7 Wr.). Besides these, forms usually designated as *F. bulbigenum* Cke. & Mass. and other variants of *F. oxysporum* in the broad sense, and also some strains of *F. moniliforme* Sheldon, may cause similar bulb rots although usually not typical basal rot. Occasionally, forms of *Fusarium* broadly referable to *F. solani* (Mart.) Appel & Wr. and to *F. roseum* Lk. in the sense of Snyder & Hansen, when associated with bacteria, cause onion bulb rots but are typically saprophytic.

Fusarium spp., pink root, root rot. Widely reported (Calif., Colo., Conn., Idaho, Mass., N.Y., Tex., Wash.) in this association but not discriminated from pink root caused by *Pyrenochaeta terrestris*, q. v., which is usually the primary cause. Specifically identified, these Fusaria belong to *F. solani* (*F. malli* Taub.) or to *F. bulbigenum* (=*F. oxysporum* sensu latu) and usually do not cause bulb rot.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

Heterosporium allii Ell. & G.Martin, leaf spot. Calif., Colo., Wash. (1). Host relationship suggests this is *Heterosporium allii* var. *cepivorum* Nicolas & Aggéry.

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot of bulbs. Calif., Okla., Tex. (1).

Macrosporium spp., purple blotch, black stalk rot. For *M. porri* Ell., see *Alternaria porri;* for *M. parasiticum* Thuem. (=*M. sarcinula* Berk.), see *Stemphylium botryosum.*

Meloidogyne spp., root knot nematodes. Ariz., Conn., Fla., Ind., N.Y., Ohio, Tex. (1); ?Fla. (4).

Mycosphaerella allicina (Fr.) Vest., on leaves. Wis. (1).

Penicillium spp., blue-mold rot. Frequent in transit and storage following mechanical and other injuries.

Peronospora destructor (Berk.) Casp., downy mildew. General (1).

Phyllosticta allii Tehon & Daniels, leaf spot. Ill., N. Mex. (1).

Phytophthora drechsleri Tucker, root rot. T.H. (1).

Pleospora herbarum (Pers. ex Fr.) Rab. (*P. allii* (Klotzsch) Ces. & de N.), on leaves. Calif. (1). Ascigerous stage of *Stemphylium botryosum*, q. v.

Pseudomonas alliicola Starr & Burkh., bacterial rot. Mass., N.Y., Wash.; perhaps Ind., Md., Ohio, as "heart rot," and elsewhere (1), but confused with *Erwinia carotovora* (L. R. Jones) Holland.

P. cepacia Burkh., sour skin, bacterial scale rot. N.Y. (1).

Puccinia asparagi DC. (O,I,II,III), rust. Calif. (1); Conn., Iowa, Kans., Minn., Nebr., Wis. (3). Only the O and I stages have been reported in natural collections.

P. porri (Sow.) Wint. (II,III), rust. Calif., Conn. (1); Conn., Nebr. (3). O and I occur on *Allium* spp. but have not been found in America.

Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, pink root. Widespread, especially in Calif., Colo., La., Tex.; and locally in Idaho, Ind., Iowa, Mass., Mich., N.Y., Oreg., Utah, Wis. (1).

Pythium spp., damping-off, root rot. Idaho, Mass., N.C., N.Y. (1). *P. spinosum* Saw. and *P. ultimum* Trow are reported in this connection in Calif.

Rhizoctonia solani Kuehn, damping-off, root rot. Occasional, reported in Colo., Idaho, Ind., Ohio, Wash., P.R.

Rhizopus stolonifer (Ehr. ex Fr.). Lind, mushy rot, following sunscald or freezing. Ind., Mass., Tex. (1); neck rot—N. Mex. (1).

Sclerotinia sclerotiorum (Lib.) d By., watery soft rot. Calif., Fla., Idaho, Mich., Ohio, W. Va. (1). Probably confused with Botrytis rot in some instances.

Sclerotium cepivorum Berk., white rot. Calif., Ky., La., N.J., Ohio, Oreg., Pa., Tex., Va. (1); Oreg., Va. (4). See note under Section I.

S. rolfsii Sacc., southern blight. Ala., Calif., Ga., N.C., Okla., S.C., Tex. (1).

Stemphylium botryosum Wallr., black stalk rot. General, usually following downy mildew or purple blotch; also on seed (1).

Thielaviopsis basicola (Berk. & Br.) Ferr., secondary root rot. Tex. (1).

Urocystis cepulae Frost, smut. General north of Middle Atlantic States to central California, occurrence in southern onion sections sporadic (1); Mass., N.Y. (4).

Yellow dwarf—virus (*Marmor cepae* Holmes, Allium virus 1 K.M.Sm.). Calif., Iowa, Ky., Minn., Oreg., Tex., W. Va., Wis. (1); Ky., W. Va. (2); N.Y. (3).

Yellows—virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif., Idaho, Maine, Mass., Minn., Tex., Wis., ?Oreg. (1). Perhaps eastern yellows in Maine, Mass., but experimental inoculation with this strain failed. Some forms of yellows—frizzle-top, or shaggy head, in Idaho—may be of physiological origin.

Blast (of inflorescence)—cause indefinite, usually attributed to physiological or environmental factors but various fungi associated, insect damage also involved. Typically in the North (Conn., Idaho, Mass., N.H., N.Y., Ohio, Wash.)

Blight—variously used term, here restricted to a foliage disease especially reported in Tex., of undetermined cause but commonly following purple blotch (*Alternaria porri*).

Chlorosis—mineral deficiency, e.g., of copper in muck soils in N.Y. and Fla.; of manganese in N.Y. and R.I.

Scald—physiological, attributed to high temperature, usually with excessive moisture, at approach of maturity. General in summer onion districts.

Stain (alkali spot)—scale discoloration, occasional in transit or storage, caused by contact with alkaline materials in bags or by ammonia fumes.

Top blight, white blast—various causes, commonly due to thrips (*Thrips tabaci* Lindeman); sometimes an early stage of downy mildew or purple blotch. General.

III. Native or Introduced Species

(1) *Allium acuminatum* Hook.
(2) *A. canadense* L., wild garlic.
(3) *A. cernuum* Roth, wild onion.
(4) *A. nuttallii* S.Wats.
(5) *A. validum* S.Wats.
(6) *A. vineale* L., field garlic.

Numerous species of bulbous herbs widely distributed in the humid parts of North America. Some (1,5) are of ornamental value, chiefly in rock and wild gardens; some (3,4) are of significant forage value and furnish food for wildlife; (2) furnishes garlic oil, used medicinally; and (6) is a pernicious weed.

Colletotrichum sp. (*?liliacearum* Ferr.), on old leaves. Reported from Mich., Nebr., and Tex. as *Vermicularia liliacearum* West.; perhaps cosmopolitan.
Heterosporium allii Ell. & G. Martin, leaf spot. Md., N.Y., Pa., Tex., Wis. (2); Del., Ill., N.J., Tex. (6).
H. iridis (Fautr. & Roum.) Jacques, leaf spot. Pa. (2).
Phoma allicola Sacc. & Roum., on leaves. Wis. (2).
Puccinia blasdalei Diet. & Holw. (O,I,II,III), rust. Idaho, Oreg., Utah, Wash. (1); Colo., Wyo. (3).
P. granulispora Ell. & Gall. (O,I,II,III), rust. Idaho, Mont., S. Dak. (3).
P. mutabilis Ell. & Gall. (O,I,II,III), rust. Utah (1), Colo. (4).
Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, pink root. Tex. (2); N. Dak., S. Dak. (3).
Pythium paroecandrum Drechs., root-tip rot. Va. (6).
Sclerotium cepivorum Berk., white rot. La. (2).
Septoria viridetingens Curt., leaf spot. On *A. tricoccum* Ait., in Md., N. Dak., N.Y., Tenn., Wis.
Uromyces aemulus Arth. (O,I,II,III), rust. Colo., Utah (1); Calif., Nev., Oreg. (5).
U. aureus Diet. & Holw. (O,I,III), rust. Calif. (5).
U. bicolor Ell. (O,I,II,III), rust. Mass., Mo., N.Y., Tex. (2); Mont. (4); Calif., Idaho (5).
U. sporoboli Ell. & Ev. (O,I), rust. Iowa, Mo., Nebr., Tex. (2). II and III on *Sporobolus* spp.
YELLOW DWARF—virus (*Marmor cepae* Holmes, Allium virus 1 K.M.Sm.). Tex. (2,6).

Aloe

Aloe spp.

Perennial, succulent herbs mostly of African origin, grown for ornament as pot plants and for bedding out in warm regions.

Pythium ultimum Trow, root rot. On *A. variegata* L. Calif.

Asparagus

I. Esculent Species

Asparagus officinalis L., asparagus.

Perennial herb of seacoasts of Europe and Asia, cultivated since ancient times for edible young shoots; the cultivated form distinguished as var. *altilis* L. Grown in gardens and for local fresh markets throughout the United States; commercial production principally in California, Illinois, New Jersey, South Carolina, and Washington.

Alternaria sp., probably *A. tenuis* Auct., branchlet blight, dieback (probably secondary). Ill., Mass., N.J., N.Y., Okla., S.C., Va. Reported also as *A. fasciculata* (Cke. & Ell.) L. R. Jones & Grout; also as *Macrosporium commune* Rab. SEE ALSO *Stemphylium botryosum.*
Armillaria mellea Vahl ex Fr., root rot. Oreg.
Ascochyta sp. (*?Ascochytula asparagina* Petr.), on stems—Del.; branchlet blight—Tex.
Botrytis cinerea Pers. ex Fr., gray-mold shoot blight (field), stem rot (market). Calif., Ill., Mass., N.Y., Wash., W. Va.
Cercospora asparagi Sacc. (*C. caulicola* Wint.), leaf (branchlet) spot. Md. to Fla., Tex., and Nebr.; also Calif., N. Mex., T.H.
Cladosporium herbarum Lk. ex Fr., on dead stems and branchlets. Cosmopolitan.
Colletotrichum sp., on stems, ?anthracnose, canker. Ala., Conn., Ill., S.C., Tex., Va., P.R.; on roots, Oreg. *C. liliacearum* (Schw.) Ferr. (commonly reported as *Vermicularia liliacearum* West. and perhaps a synonym of *C. dematium* (Pers. ex Fr.) Grove) is common on dead stems, often following rust; the relation to reputed pathogenic *Colletotrichum* spp. unknown.
Confertopeltis asparagi Tehon, on dead stems. Ill.
Diplodia asparagi Pk., on stems, N.Y.; stem rot, Tex. *?Ascochytula asparagina.*
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. General in markets, occasional in fields. Bacterial root rot of undetermined identity reported in Ky. and Oreg.
Fusarium spp., root and stem rot, wilt (in fields); Fusarium rot, moldy tip (in markets). General. Specific determinations lacking or doubtful in most reports: *F. culmorum* (W.G.Sm.) Sacc., reported in Ill.; *F. semitectum* Berk. & Rav. in S.C. and W. Va.—both are synonyms of *F. roseum* Lk. emend. Snyd. & Hans.; *F. oxysporum* Schlecht. f. *asparagi* Cohen in Calif., also identified in S.C., Wash., and ?N.J.; *F. moniliforme* Sheldon in S.C. and P.R.
Gibberella saubinettii (Mont.) Sacc. (*?G. pulicaris* (Fr.) Sacc.), on stems. Del., Ind., Va., W. Va. *Heterodera marioni* (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophoma lanceolata (Cke. & Ell.) Berl. & Vogl. (*Dothiorella lanceolata* (Cke. & Ell.) Petr., on stems. N.J.
Macrophomina phaseoli (Maubl.) Ashby, ashy stem blight. Tex.
Meloidogyne sp., root knot nematodes. ?S.C.
Penicillium spp., blue-mold rot. Occasional in markets, also secondary root rot in Calif. and Oreg.
Phoma spp., on stems, ?canker. Variously reported as *P. asparagi* Sacc. (=*Phomopsis asparagi* (Sacc.) Bub.) in Ala., Ark., N.J.; *P. asparagina* Tehon & Stout in Ill.; *P. media* Ell. & Ev. in Ill., Kans., N.Y., Ohio; *P. microspora* Berk. & Curt. in S.C. Associated and probably connected with different ascigerous forms reported as *Diaporthe* sp.—N. Dak.; *Leptosphaeria comatella* (Cke. & Ell.) Sacc.—N.J., N.Y.; *Metasphaeria asparagi* Tehon & Stout—Ill. SEE ALSO *Ascochyta, Diplodia* and *Macrophoma.*
Phytophthora sp., stem rot. Calif.
Pleospora herbarum (Pers. ex Fr.) Rab. (*P. asparagi* Rab.), on stems. Ascigerous stage of *Stemphylium botryosum*, q.v.
Puccinia asparagi DC. (O,I,II,III), rust. General on susceptible varieties.
Rhizoctonia crocorum DC. ex Fr., root rot. ?Calif.
R. solani Kuehn, stem canker, damping-off. Occasional in fields; sometimes red stain of stalks in markets.
Sclerotinia sclerotiorum (Lib.) d By., watery soft rot. Occasional in the South.
Stemphylium botryosum Wallr., secondary branchlet blight or saprophytic on stems and seed. Gen-

eral. Conidial stage of *Pleospora herbarum* (Pers. ex Fr.) Rab.

Vermicularia liliacearum West.: SEE *Colletotrichum.*

II. Ornamental Species

(1) *Asparagus asparagoides* (L.) Wight, "smilax" of florists.
(2) *A. plumosus* Baker, asparagus-fern.
(3) *A. sprengeri* Regel, Sprenger asparagus.

Erect to climbing perennial vines of South Africa, grown under glass for decorative greens; (2) grown in lath shelters in Florida, California, and Texas.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall, ?fasciation. Fla., Oreg. The causal organism may have been *Corynebacterium fascians* (Tilford) Dows. but was reported as indicated (3).

Ascochytula asparagina Petr., stem canker, blight. Fla., Tex. (2). SEE ALSO *Didymosphaeria brunneola.*

Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska (1).

Cercospora asparagi Sacc., on branchlets. Fla. (2).

Cladosporium sp., leaf mold, associated with yellowing and dropping of leaflets. Fla., Miss., Tex. (2).

Colletotrichum sp., on stems. Fla. (2).

Didymosphaeria brunneola Niessl, on stems. Fla. (2). Said to be the ascigerous stage of *Ascochytula asparagina.*

Fusarium sp., root rot, wilt. N.J. (1); Fla., Wash. (2).

Helminthosporium sp., on branchlets. Fla. (2).

Hendersonia asparagi Pass., on stems and branchlets. Fla. (2).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Leptosphaeria asparagina Karst., on stems. Fla. (2).

Meloidogyne spp., root knot nematodes. Fla. (2), Calif. (3).

Phoma sp., *?Phomopsis asparagi* (Sacc.) Bub., on stems, ?canker. Fla. (2).

Rhizoctonia solani Kuehn, root rot. N.Y. (3).

Stagonospora smilacis (Ell. & Mart.) Sacc., leaf spot. Wis. (1).

"RUST"—cause not determined but apparently complex, probably involving environmental factors (excessive humidity), physiological (aging and exhaustion of plants), and weakly parasitic fungi. Fla. (2).

Aspidistra

A. elatior Blume (*A. lurida* Hort.), aspidistra.

Perennial plant of China, commonly grown as a house and conservatory plant; popular florists' plant with its stiff, shining foliage.

Ascochyta aspidistrae Mass., leaf spot. Minn., N.J.

Colletotrichum omnivorum Hals. (*?C. liliacearum* (Schw.) Ferr.), leaf spot. Calif., Mo., N.J., Pa., W. Va.

Labrella aspidistrae Tehon & Daniels, leaf blight. Ill., La.

Brodiaea

(1) *B. capitata* Benth.
(2) *B. douglasii* S.Wats.
(3) *B. ixioides* (Ait. f.) S.Wats.
(4) *B. pulchella* (Salisb.) Greene
(5) Other species.

Cormous herbs of open ground, chiefly in the Pacific Coast States, sometimes grown in wild gardens. The genus has been much subdivided by some authorities but here includes *Dichelostemma, Hookera, Triteleia,* etc.

Puccinia carnegiana Arth. (O,I,III), rust. Ariz. (5).

P. dichelostemmae Diet. & Holw. (O,I,III), rust. Wash. (2); Oreg., Wash. (4); Calif. (5).

P. moreniana Dudl. & C. H. Thompson (III), rust. Calif. (1).

P. nodosa Ell. & Harkn. (O,I,II,III), rust. Calif. (1).

P. pattersoniana Arth. (O,I), rust. Idaho, Utah, Wash. (2). II and III on *Agropyron* and *Elymus.*

P. subangulata Holw. (O,I,III), rust. Wash. (4).

Stagonospora cylindrocarpa (Ell. & Ev.) Sacc., on stems. Wash. (5).

Uromyces brodiaeae Ell. & Harkn. (O,I,III), rust. Oreg. (2); Calif. (3); Calif., Wash. (5).

Calochortus

Calochortus spp., Mariposa lily, globe-tulip.

Numerous species of showy-flowered, cormous herbs of mountain meadows, slopes, and open woods chiefly in the Pacific Coast States; some ranging eastward on the Plains. Grown in gardens or flowered indoors as pot plants.

Puccinia calochorti Pk. (O,I,III), rust. On many species in Calif., Oreg. and Wash. to Nebr. and N. Mex.

Camassia, camass

(1) *C. leichtlinii* (Baker) S.Wats.
(2) *C. quamash* (Pursh) Greene, common camass.
(3) *C. scillioides* (Raf.) Cory, eastern camass, wild-hyacinth.

Bulbous herbs of mountain meadows: (1,2) of the Pacific Northwest and California, (3) of the Eastern and Central States. The bulbs furnish food for wildlife, (2) also are eaten by the Indians. Bulbs are sometimes planted for the showy flowers.

Botrytis cinerea Pers. ex Fr., Botrytis blight. Oreg. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).

Septoria chlorogali (Cke. & Harkn.) Sprague, leaf spot. Oreg. (1).

Urocystis colchici (Schlecht.) Rab., leaf smut. Oreg. (2), Ind. (3).

Chlorogalum

(1) *C. pomeridianum* (DC.) Kunth., amole, soap-plant.
(2) Other species.

Bulbous herbs of dry open ground in California, sometimes grown for ornament.

Heterosporium gracile Sacc., leaf spot. Calif. (2).

Mycosphaerella chlorogali Fairm., on stems. Calif.

Pleospora chlorogali Fairm. (*?P. herbarum* (Pers. ex Fr.) Rab.), on stems. Calif.

Septoria chlorogali (Cke. & Harkn.) Sprague, on stems. Calif.

Uromyces aureus Diet. & Holw. (O,I,III), rust. Calif.

Clintonia

(1) *C. borealis* (Ait.) Raf., yellow clintonia, cornlily, bluebead.
(2) *C. uniflora* (Schult.) Kunth., queencup.

Rhizomatous, perennial herbs of moist woods: (1) in the Northeastern and North Central States, (2) in the Pacific Northwest; sometimes grown in wild gardens.

Ceratobasidium anceps (Bres. & Syd.) Jacks., leaf rot. Reported in Quebec, Canada, but identical symptoms observed in other northern localities—Maine, N.Y., Wis.
Puccinia mesomajalis Berk. & Curt. (III), rust. Mich., Minn., N.H., N.Y., Tenn., Va., Wis. (1); Calif., Idaho, Mont., Oreg., Wash. (2).
Synchytrium aureum Schroet., false rust. Wis. (1).

Colchicum

C. autumnale L., autumn-crocus, meadow saffron.

Cormous herb of Europe and North Africa, cultivated for ornament.

Botrytis elliptica (Berk.) Cke., leaf spot, tip blight. Wash.
Colletotrichum liliacearum (Schw.) Ferr., on old leaves, Del.
Urocystis colchici (Schlecht.) Rab., leaf smut. Del., N.Y., Ohio, Pa., Wash.

Convallaria

C. majalis L., lily-of-the-valley.

Rhizomatous, perennial herb of Europe and Asia, widely grown in gardens and locally naturalized in the Eastern States; also flowered commercially under glass from imported pips.

Ascochyta majalis Massal., leaf blotch. Pa.
Botrytis paeoniae Oud. (*?B. cinerea* Pers. ex Fr. f. *convallariae* Kleb.), rhizome rot, gray-mold blight. Ill., Maine, Pa.
Cercospora sp., on leaves. S.C.
Gloeosporium convallariae Allesch., leaf spot. N.Y.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Kabatiella microsticta Bub., leaf spot (?secondary). Md.
Meloidogyne sp., root knot nematodes. Occasional in imported pips.
Phyllosticta sp., leaf spot. N.J., N.Y.
P. vagans Pk., on leaves. Va.
Pratylenchus pratensis (De Man) Filip., root nematode. Occasional in imported pips and associated with forcing failures.
Sclerotium rolfsii Sacc., southern blight. Md.

Cordyline

Cordyline spp., especially *C. terminalis* Kunth., "Dracaena."

Palm-like shrubs of eastern Asia, grown for ornament in the open in warm regions but more commonly as a pot plant indoors. See also *Dracaena* spp., plants of both genera being known under this name in horticulture.

Cladosporium dracaenatum Thuem. (*?C. herbarum* Lk. ex Fr.), on leaves. S.C.
Glomerella cincta (Berk. & Curt.) Spauld. & Schrenk, leaf spot. N.J.
Phyllosticta dracaenae P.Henn., leaf spot. Ohio, Pa.
P. maculicola Hals.—N.J., P.R.
Phytophthora spp., root rot. N.J.

Dasylirion

(1) *D. wheeleri* S.Wats., sotol.
(2) Other species.

Robust, woody, perennial plants of arid plains in the Southwest; grazed by cattle and wildlife; used decoratively; various parts of plants used by aborigines in basketry and for food and drink.

Botryosphaeria dasylirii (Pk.) Th. & Syd., on leaves. Ariz., N. Mex., Tex. (1).
Coniothyrium concentricum (Desm.) Sacc. and *C. hysterioideum* Karst. & Hariot, on leaves. Tex. (2).

Dianella

Dianella spp.

Rhizomatous perennials of southern Pacific Islands, sometimes grown for ornament.

Meliola gregoriana F.L.Stevens, black mildew. T.H.
Mosaic—unidentified virus. T.H.

Dracaena

Dracaena spp.

Palmlike shrubs and trees of Africa, grown for ornament, sometimes in the open in warm regions, especially *D. draco* L., dragontree, grown outside in California and the Far South, but more commonly as pot plants indoors in the United States. Horticultural Dracaenas also include *Cordyline*, q.v.

Cladosporium dracaenatum Thuem., on leaves. S.C.
Colletotrichum dracaenae Allesch., leaf spot. N.J.
C. gloeosporioides Penz.: See *Glomerella cincta.*
Coniothyrium dracaenae Stevens & Weedon, on leaves. T.H.
Diplodia theobromae (Pat.) Nowell, on leaves. Conidial stage of *Physalospora rhodina* (Berk. & Curt.) Cke.
Gloeosporium polymorphum Trinch. and *G. thuemenii* Sacc., leaf spot. Widespread.
Glomerella cincta (Ston.) Spauld. & Schrenk. (*?G. cingulata* (Ston.) Spauld. & Schrenk), leaf spot, tip blight. Fla., La., N.J., Pa., P.R., and probably general. Usually in the conidial stage and reported as *Colletotrichum* or *Gloeosporium* sp.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Lophodermium dracaenae Phil. & Harkn. (*Dermascia dracaenae* (Phill. & Harkn.) Tehon), black leaf spot. Calif.
Meliola dracaenae F.L.Stevens, black mildew. T.H.
Meloidogyne sp., root knot nematodes. Fla.
Phyllosticta dracaenae Griff. & Maubl., leaf spot. N.J.
P. draconis Berk.—Pa.
P. maculicola Halst.—Mass., N.J., P.R.
Physalospora dracaenae Sheldon (*?P. obtusa* (Schw.) Cke.), ?tip blight. W. Va.
P. rhodina (Berk. & Curt.) Cke.—Md.
Vermicularia concentrica Lév., on leaves.

Eremurus

E. robustus Regel.

Hardy perennial plant of central Asia,

grown for ornament, its flower stalk is very striking.

Myrothecium roridum Tode ex Fr., leaf spot. Ohio.

Erythronium, dogstooth-violet

(1) *E. albidum* Nutt., white dogstooth-violet.
(2) *E. americanum* Ker, yellow adderstongue, troutlily.
(3) *E. grandiflorum* Pursh
(4) *E. montanum* S.Wats.

Bulbous perennial herbs of woodlands, native to the cooler parts of the United States: (1,2) in the Eastern States, and (3,4) in the northern Rocky Mountain and Pacific Coast States; grown in wild gardens and rockeries.

Asteroma tenerrimum Grogn. var. *erythronii* Sacc., black spot. Idaho, Mont., Wash. (3).
Botrytis sp., Botrytis blight. Ill. (1); N.Y., Vt. (2); Wash. (3,4). Also on *E. multiscapoideum* (Kell.) Nels. & Kennedy, Wash.
B. elliptica (Berk.) Cke.—Wash. (3).
Ciborinia gracilis (Clements) Whet., leaf blight. Ill., Nebr. (1).
C. erythronii Whet. Tex. (1), N.Y. (2).
?Protomyces erythronii Pk., on petioles and leaves. Mass., N.Y. (2).
Sclerotium sp., on bulbs. Calif.
Urocystis erythronii Clint., leaf smut. Conn., N.Y. (1,2).
Uromyces heterodermus Syd. (O,III), rust. Tex. (1); Calif., Colo., Idaho, Mont., Utah, Wash., Wyo. (3); Oreg., Wash. (4).
Ustilago heufleri Fckl., smut. Mo., Tex. (1); Del., Md., Mich., Mo., N.J., N.Y., Pa. (2).

Fritillaria

Fritillaria spp., fritillary.

Bulbous herbs, several species of which occur in meadows and open woods in the Pacific Coast to Utah and Montana; may be grown for ornament; other species of Europe and western Asia also are grown in gardens.

Phyllosticta fritillariae Bonar & W.B.Cooke, leaf spot. On *F. atropurpurea* Nutt., Calif.
Uromyces miurae Syd. (III), rust. On *F. camtschatcensis* (L.) Ker-Gawl in Alaska; on *F. lanceolata* Pursh, Wash.
Mosaic—undetermined virus. N.Y. *F. pudica* (Pursh) Spreng. has been shown suspectible to artificial inoculation with cucumber mosaic and lily mottle viruses, *Marmor cucumeris* Holmes and *M. tulipae* Holmes.

Galtonia

G. candicans (Baker) Decne, summer-hyacinth.

Flowering bulb of South Africa, grown for ornament.

Mosaic—virus (*Marmor scillearum* F.F.Sm. & Brierley). Oreg.

Hemerocallis, daylily

(1) *H. fulva* L., tawny daylily.
(2) Other species.

Hardy perennial herbs of Europe and Asia, grown for ornament. *H. fulva* (1) is naturalized in the Eastern States. The modern daylilies of gardens belong to various species, such as *H. citrina* Baroni, *H. flava* L., *H. aurantiaca* Baker, *H. thunbergii* Baker, and others native to eastern Asia.

Botrytis sp., leaf spot, gray mold blight. Md.
Ceratostomella paradoxa (de Seynes) Dade—T.H.
Cercospora hemerocallis Tehon (=*C. amaryllidis* Ell. & Ev.), leaf spot. Ill. (1).
Colletotrichum liliacearum (Schw.) Ferr. (*?C. dematium* (Pers. ex Fr.) Grove), on dead stems. Ala., Mass., Md., N.H., N.Y., Pa., probably cosmopolitan. Usually reported as *Vermicularia liliacearum* Schw. (1831) or *V. liliacearum* West. (1866), considered to belong rather to *Colletotrichum* by several authors but first so published by Ferraris (1902), later as a combination based on Westendorp's species by Duke (1928); the indicated combination, although arbitrary, is historically correct.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Heterosporium sp., leaf spot. N.J. (1); N.Y., Tex. (2).
Kabatiella sp. (*?microsticta* Bub.) leaf blight (?secondary). Md.
Meloidogyne sp., root knot nematodes.
Phomopsis achilleae (Sacc.) Hoehn., on dead scapes. T.H.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (species not designated).
Phytophthora sp.—T.H.
Sclerotium sp., root rot. Ind.
S. rolfsii Sacc.—T.H.

Hosta

Hosta spp., plantainlily.

Hardy perennial herbs of eastern Asia, grown for ornamental flowers and foliage.

Alternaria sp., leaf spot. N.Y.
Botrytis cinerea Pers. ex Fr., crown rot. Alaska, N.J.
Colletotrichum omnivorum Hals., (*?C. liliacearum* (Schw.) Ferr.), on petioles and scapes. Conn., N.J., Va.
Phyllosticta sp., leaf spot. N.J.
Rhizoctonia solani Kuehn, root rot. N.J.
Sclerotium delphinii Welch, crown rot. Conn., Minn., N.J., N.Y.
S. rolfsii Sacc.—Md.

Hyacinthus, hyacinth

H. orientalis L., common hyacinth, including var. *albulus* Baker, Roman hyacinth of florists.

Bulbous herb of the Mediterranean region; widely grown for ornament, indoors as a pot plant and in the open as a hardy spring bulb, chiefly from imported stocks.

Botrytis sp., gray mold (following frost injury). N.C.
Ditylenchus dipsaci (Kuehn) Filip., bulb nematode, ring disease. N.J., Wash.
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. Cosmopolitan, reported from Calif., Mich., N.J., N.Y., Ohio, Wash.
Fusarium sp. (*?F. bulbigenum* Cke. & Mass.), bulb rot. Colo., Mo., N.J., R.I., Tex., Wash.
Penicillium spp., blue-mold rot, scale blemishes. Cosmopolitan. *P. corymbiferum* Westling and *P. hirsutum* Dierckx have been identified as causing bulb rot.

Phytophthora sp., root rot. N.J.
Sclerotinia bulborum (Wakk.) Rehm, black slime. Reported on imported bulbs grown in U.S. in former years, no authentic records now available; rarely reported in Europe at present although formerly recorded as destructive; first recognized with certainty in England in 1938.
Xanthomonas hyacinthi (Wakk.) Dows., yellows. Occasional in imported bulbs, reported from Mass., Mich., Minn., N.J., Tex., Wash.
MOSAIC—virus (in part *Marmor scillearum* F.F.Smith & Brierley, identified in Oreg.; in part unidentified). Reported in Calif., Md., N.Y., Tex., Wash., probably widespread but not commonly noted. This host also shown susceptible to cucumber mosaic virus.
LOOSE BUD, STEM-BREAK—physiological, excessive water intake during early shoot growth. Occasional in greenhouse culture.

Kniphofia

Kniphofia spp., especially *K. uvaria* Hook., torchlily, pokerplant.

Perennial herbs of Africa, grown for ornament.

Alternaria sp., leaf spot. Ala.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif.

Lachenalia

L. tricolor Thunb., cape-cowslip.

Bulbous herb of South Africa, grown as a pot plant for ornament.

MOSAIC—virus (*Marmor scillearum* F.F.Smith & Brierley). Ala.

Lilium, lily

I. Cultivated Lilies, the Easter Lily

Lilium longiflorum Thunb., Easter lily.

Noble flowering bulb of Japan and Formosa, grown chiefly under glass as a pot plant and for cut flowers; the principal forcing lily of commercial florists. Imported bulbs, mostly from Bermuda, Japan, and Formosa, are also grown commercially in Florida, Louisiana, Texas, California, and Oregon. Some of the different forms have been characterized as species or botanical varieties (var. *eximium* (Court.) Baker, Bermuda lily, var. *takesima* Duchartie, Japanese Easter lily, var. *insulare* Hort., Erabu lily) but are not separated here.

Aphelenchoides olesistus (Ritz.-Bos) Steiner, bunchy-top, dieback. Calif., Oreg., Wash.; also in greenhouse stocks grown from bulbs originating in these States in Md., Ill., Wash.
Botrytis cinerea Pers. ex Fr., Botrytis blight. Calif., Oreg., Wash.; probably cosmopolitan. *B. elliptica* (Berk.) Cke. is reported as the cause of Botrytis blight, or spot, of Easter lilies in Florida, Maine, New York, and Washington. Present information is insufficient to determine whether this is a distinct species as reported in America or belongs to *B. cinerea* in a broad sense.
Cercospora sp., leaf spot. Fla.
Colletotrichum lilii Plakidas, black scale rot. La., ?Miss., Oreg., Wash.
Cylindrocarpon radicicola Wr., scale-tip rot (?secondary). Pacific Northwest.
Erwinia carotovora (L. R. Jones) Holland, bacterial soft rot. Ga.
Fusarium spp., ?secondary in scale-tip rot. Oreg.
F. oxysporum Schlecht. f. *lilii* Imle, Fusarium rot of bulbs, roots, and stems. Gulf States. According to Imle, reported on this host only in Fla.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Fla., T.H.
Penicillium spp., blue mold of scales, dry rot of bulbs (typically in cold storage and associated with bulb mites). Cosmopolitan.
Phytophthora sp. (*?P. parasitica* Dast.), stump rot, top rot. N.J., N.Y.
Pythium splendens Braun, root rot. Fla.
Rhizoctonia solani Kuehn, stem canker. Calif., Oreg., Wash.
R. tuliparum Whet. & J. M. Arthur, stem rot. Wash.
Rhizopus sp. (*?R. stolonifer* (Ehr. ex Fr.) Lind), soft rot of bulbs. Reported in Tex., probably cosmopolitan but less frequent on Easter lilies than on most garden types.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Conn., Fla.
Sclerotium rolfsii Sacc., southern blight. Fla., La., Oreg.
Tritirachium dependens Limber—La.
MOTTLE, MILD MOSAIC—virus (several strains of *Marmor tulipae* Holmes, Tulipa virus 1 K.M.Sm., not typically those causing tulip mosaic). General in commercial stocks though often masked.
NECROTIC FLECK—virus complex consisting of a symptomless virus (*Adelonosus lilii* Brierley & F. F. Smith), which is general in American and Oriental commercial stocks, together with certain strains of cucumber mosaic virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.). Widespread in Oriental forcing stocks, occasional in domestic bulb stocks; eliminated in some by roguing for the cucumber virus component.
ROSETTE, YELLOW FLAT—virus (Lilium virus 1 K.M.Sm.) Fla., in domestic stocks; also reported in Calif., La., Md., Mo., N.J., N.Y. in Bermuda and Oriental forcing stocks.
YELLOW-TOP—cause unknown, virus suspected. Ala., Fla., La.
LEAF BURN—physiological, sometimes due to nitrogen or magnesium deficiency, or both; perhaps also to temporary dryness during forcing. Noted in Croft variety in forcing in eastern U.S.
SCALE-TIP ROT—necrosis or shriveling of scale tip, especially in Croft variety. Oreg., Wash. Cause unknown, nonparasitic, perhaps related to soil moisture and aeration.

II. Cultivated Lilies, the Garden Lilies

(1) *Lilium auratum* Lindl., goldenbanded lily.
(2) *L. candidum* L., Madonna lily.
(3) *L. dauricum* Ker-Gawl., candlestick lily, including *L. elegans* Thunb. and var. *batemanniae* Hort., hybrid derivatives.
(4) *L. regale* Wilson, regal lily.
(5) *L. speciosum* Thunb., showy lily.
(6) *L. tigrinum* Ker-Gawl., tiger lily.
(7) Other species and hybrids.

Flowering bulbs, mostly native to eastern Asia; grown for ornament chiefly in the open, i.e. hardy; some species also flowered under glass for cutting. For American species cultivated in gardens, see section III.

Aphelenchoides olesistus (Ritz.-Bos) Steiner—?Md. (on *L. formosanum* (Baker) Wallace.).

Botrytis cinerea Pers. ex Fr. and *B. elliptica* (Berk.) Cke., Botrytis blight, leaf spot. General on all kinds of lilies, especially (1,2,5,6); some species and varieties are appreciably resistant. The most frequent symptom, leaf spot or blotch, is associated with the fungus commonly identified as *B. elliptica*, which is morphologically indistinguishable from *B. cinerea* occurring as a cosmopolitan saprophyte and facultative parasite on other hosts. The concept of the latter by some authors is sufficiently broad to include both species, but its prevailing forms on lilies are at least physiologically distinct.

Cladosporium sp. (*?C. herbarum* Lk. ex Fr.), leaf and bulb-scale mold. Cosmopolitan.

Colletotrichum liliacearum (Schw.) Ferr. (*?C. dematium* (Pers. ex Fr.) Grove), on dead stems. Reported from Md. (4); Ill., Maine (6); probably cosmopolitan.

C. lilii Plakidas, black scale disease. Md. on "*L. umbellatum*" Hort., not Pursh.

Erwinia carotovora (L. R. Jones) Holland, bacterial soft rot. Mass., N.J., ?W. Va. (2).

Fusarium oxysporum Schlecht. f. *lilii* Imle, Fusarium rot of bulbs and juvenile plants. Occasional on most species, especially (1,2, and 5), in the Eastern, Southern, and Central States and Pacific Northwest. Fusarium rot reported in Conn., Fla., Ill., Mass., Md., Mich., N.J., N.Y., Ohio, Oreg., Pa., Vt., Wash. It causes seedling rot and rot of young scales. *L. formosanum*, *L. japonicum* Thunb., and *L. martagon* L. are especially susceptible. Some reports of *Fusarium* sp. perhaps relate to other forms or species.

Heterosporium sp. (*?H. iridis* (Fautr. & Roum.) Jacques), leaf spot. Md. (7).

Kabatiella microstica Bub., on leaves (?secondary leaf spot). Md., N.J., N.Y., Pa. (1,2,7).

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot of bulbs. Calif. (on *L. philippinense* Baker).

Penicillium spp., blue mold of scales, sometimes dry rot of entire bulbs. Cosmopolitan, especially on bulbs that are cold-stored (1,3, and 5). *P. cyclopium* Westling and *P. hirsutum* Dierckx have been identified.

Phytophthora cactorum (Leb. & Cohn) Schroet., stem rot, foot rot. Md. (2.4,5,7); Minn. (2,4); Mich., N.C., N.J. (4); Minn., N.Y., Ohio, Wash., Wis. (7).

P. parasitica Dast., stem rot, top rot. Md., N.J., N.Y. (5); Ind. (7).

Pythium debaryanum Hesse, damping-off. Ind. (4).

Rhizoctonia solani Kuehn, damping-off of seedlings. Cosmopolitan. Stem rot—Conn. (1,2); Miss. (2); Minn., Oreg. (5); Mass., Tex. (7).

Rhizopus sp. (*?R. stolonifer* (Ehr. ex Fr.) Lind.), soft rot of bulbs (usually in transit or storage). Cosmopolitan, especially on (1,4,5,7).

Sclerotinia sclerotiorum (Lib.) d By., stem rot. Conn. (2); Tex., Wash. (7).

Sclerotium rolfsii Sacc. (*S. delphinii* Welch) southern blight. Conn., Ill., N.Y. (2); N.J., N.Y., Oreg., Tenn. (4); Ind., Miss., N.Y., Pa. (7). Scale and stalk rot. Ill., N.Y. (2); also on (1,2,5).

Sporotrichum sp., bud blight (?secondary). Va. (1).

Uromyces holwayi Lagh. (O,I,II,III), rust. Conn., Mass., Mich., N.Y., Wash. (2).

Vermicularia liliacearum West.: SEE *Colletotrichum liliacearum*.

MOSAIC—virus (in part *Marmor tulipae* Holmes, Tulipa virus 1 K.M.Sm., generally strains other than those causing typical tulip mosaic; in part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.). General in all species named and many others although some are resistant. The former virus is more prevalent; both are sometimes present. Symptoms range from completely masked to systemic chlorosis and necrosis, varying with the strain and host.

?ROSETTE, YELLOW FLAT—virus (Lilium virus 1 K.M.Sm.). N.Y. (3). Various garden lilies, including (1,3,4,5,7), have been shown susceptible to this virus.

CHLOROSIS—physiological, in part caused by iron deficiency. N.Y. (1,5).

CROOKNECK—cause not determined but virus suspected, perhaps a necrotic strain of *Marmor tulipae*. N.Y. (1).

LIMBERNECK, ?TOPPLE (collapse of stem below inflorescence)—cause unknown but believed physiological, perhaps associated with soft, rapid growth and mineral deficiency. Md., Miss., N.J., N.Y., Wash. (1,2,4,5,7).

III. Native Species

(1) *Lilium canadense* L., wild yellow, or Canada, lily, and *L. michiganense* Farw., Michigan lily.
(2) *L. columbianum* Hanson
(3) *L. humboldtii* Roez. & Leichtl.
(4) *L. pardalinum* Kell.
(5) *L. philadelphicum* L., wild, or orange-red, lily, wood lily.
(6) *L. superbum* L., Turks-cap.
(7) *L. washingtonianum* Kell.

Bulbous perennial herbs of meadows and prairies, mostly in the Northeastern, North Central, and especially the Pacific Coast States. These species are of distinctive ornamental value and are grown as garden lilies: (1) in the Eastern and Central States, (2) in Pacific Coast States, (3) in California, (4,7) in California and Oregon, (5,6) in Eastern and Central States.

Botrytis cinerea Pers. ex Fr., (*?B. elliptica* (Berk.) Cke.), Botrytis blight. Reported in Md., N.Y., Oreg., Vt., Wash., probably general under humid conditions; noted on (1,2,3,4,6,7).

Cercosporella lilii Dearn. (*?C. inconspicua* (Wint.) Hoehn.), leaf spot. Conn., N.Y. (1).

Fusarium oxysporum Schlecht. f. *lilii* Imle, Fusarium rot. N.Y. (4,6), Va. (7).

Phytophthora cactorum (Leb. & Cohn) Schroet., stem rot. Md. (7).

Puccinia sporoboli Arth., (O,I), rust. N. Dak. (on *L. umbellatum* Pursh). Nebr. II and III on *Sporobolus* spp.

Ramularia sp., leaf spot. Wash.

Uromyces holwayi Lagh. (O,I,II,III), rust. Maine to N.J., Nebr., and Minn. (1); Calif., Idaho, Oreg., Wash (2); Wash. (3); Calif., Wash. (4); Ill., Mass., N.H., N.Y. (5); R.I. to Iowa and Minn. (6); Calif., Oreg. (7).

MOSAIC—virus(es), commonly *Marmor tulipae* Holmes, Tulipa virus 1 K.M.Sm.; sometimes *M. cucumeris* Holmes, Cucumis virus 1 K.M.Sm., or both. Occasional on all listed species when cultivated.

LIMBERNECK—physiological. N.Y. (3,7).

Maianthemum

(1) *M. bifolium* (L.) DC.
(2) *M. canadense* Desf., false, or wild-lily-of-the-valley, two-leaved Solomons-seal, muguet.
(3) *M. dilatatum* (Wood) A.Nels. & Macbride

Small, spring-blooming, perennial herbs of moist woodlands in northern regions: (1) in Europe, (2) in the Northeastern and North Central States, and (3) in California and the Northwest. Sometimes grown in wild gardens; (2) furnishes food for wildlife.

Botrytis sp., Botrytis blight. N.Y. (2).
Cercospora subsanguinea Ell. & Ev.: See *Ramularia rubicunda.*
Phoma maianthemi Pk., *Phyllosticta cruenta* (Fr.) Kickx.: See *Sphaeropsis cruenta.*
Puccinia sessilis Schneid. (O,I), rust. Mass., Mich., Minn., N.Y., Pa., Wis. (2). II and III on *Phalaris* spp.
Ramularia rubicunda Bres. (*Cercospora subsanguinea* Ell. & Ev.), leaf spot. Mich., N.Y., Ohio, Pa., Wis. (2); Calif. to Alaska (3). Several authors have pointed out that the valid specific name is *subsanguinea,* but the combination does not appear to have been formally published.
Sphaeropsis cruenta (Fr.) Archer & Gilman, leaf spot. Alaska, Wash. (3). Various reports of *Phoma* and *Phyllosticta* on this host appear to belong here.
Uromyces acuminatus Arth. var. *magnatus* (Arth.) J. J. Davis (O,I), rust. Mich., N.Y., Wis. (2). II and III on *Spartina* spp.

Manfreda

M. maculosa (Hook.) Rose, wild tuberose, spicelily.

Bulbous plant closely allied to *Agave.*

Aecidium modestum Arth. (O,I), rust. Tex.
Cercospora amaryllidis Ell. & Ev.—Tex.
Phyllosticta hymenocallidis Seaver—Tex

Medeola

M. virginiana L., Indian cucumber-root.

Perennial herb of moist woodlands in the Eastern and North Central States, bearing edible white tubers.

Medeolaria farlowii Thaxt., stem hypertrophy. Maine, Mass., N.J.
Phyllosticta medeolae Dearn. & House, leaf spot. N.Y.

Melanthium

M. parviflorum (Michx.) S.Wats., bunchflower.

Perennial herb of wet meadows, sometimes grown in wild gardens.

Puccinia atropuncta Pk. & G. W. Clint. (II,III), rust. N.C., Tenn., Va.
Septoria allardii Stevenson & Pollack, leaf spot. Va.

Muscari, grape-hyacinth

(1) *M. botryoides* (L.) Mill.
(2) *M. comosum* Mill.

Hardy, spring-blooming bulbs of the Mediterranean region, grown in gardens, sometimes naturalized.

Sclerotium sp. (*?S. bulborum* (Wakk.) Rehm), dry rot. Mo., Wash. (1).
Ustilago vaillantii Tul., flower smut. Wash. (1), Mass. (2).

Nolina

N. microcarpa S.Wats.

Woody perennial of arid slopes in the Southwest, sometimes planted for ornament, and may furnish browse for livestock.

Tolyposporella nolinae Clint., leaf smut. Ariz., N. Mex., Tex.

Nothoscordum, false-garlic

(1) *N. bivalve* (L.) Britt.
(2) *N. fragans* (Vent.) Kunth

Bulbous herb: (1) native of Southern States, (2) naturalized from South Africa; sometimes grown for ornament; of food value to wildlife.

Colletotrichum circinans (Berk.) Vogl., anthracnose. Okla. (1).
Uromyces hordeinus Arth. (O,I), rust. Kans., Okla., Tex. (1). II and III on *Festuca* and native *Hordeum* spp.
U. primaverilis Speg. (O,I,III), rust. Ill., Mo., Tex. (1).
Mosaic—virus (*Marmor angustum* McK.). La. (2).

Ornithogalum, star-of-Bethlehem

(1) *O. umbellatum* L., nap-at-noon.
(2) Other species, especially *O. thyrsoides* Jacq.

Hardy flowering bulb: (1) of Mediterranean region, sometimes grown in wild gardens and widely escaped in the Eastern and Northern States; (2) tender bulbs of South Africa, grown mostly under glass as pot plants and for cut flowers.

Didymellina ornithogali Jacques (*Heterosporium ornithogali* Klotzsch ex Cke.), leaf spot. Ill., Pa., Wash. (1).
Sclerotium rolfsii Sacc., southern blight. Calif. (2).
Septoria ornithogali Pass., leaf spot. Conn., Mass. (1).
Mosaic—virus (*Marmor scillearum* F.F.Sm. & Brierley). Ala., Okla., Oreg. (2). *O. thyrsoides* has been shown to be susceptible to artificial inoculation also with the lily mottle virus (*Marmor tulipae* Holmes, Tulipa virus 1 K.M.Sm.).

Polygonatum, Solomons-seal

(1) *P. biflorum* (Walt.) Ell., small Solomons-seal.
(2) *P. canaliculatum* (Muhl.) Pursh, great Solomons-seal.

Rhizomatous perennial herbs of woodlands: (1) chiefly in the East; (2) throughout the United States, more frequently northward; sometimes grown in wild gardens; furnish food for wildlife.

Colletotrichum liliacearum (Schw.) Ferr., usually on dead stems, also ?leaf spot. Reported as *Vermicularia polygonati* Schw. in Ind. and Maine; probably cosmopolitan.
Guignardia polygonati (Schw.) Lindau, on leaves. Pa. (1), Iowa (2).
Phyllosticta convallariae Pers. ex Seaver; *P. cruenta* (Fr.) Kickx; *P. pallidior* Pk.: See *Sphaeropsis cruenta.*
Puccinia sessilis Schneid. (O,I), rust. Ala., Conn., Iowa, Ohio, N.Y., Pa., Wis. (1); Idaho, Iowa, Minn., Wis., Wyo. (2). II and III on *Phalaris* spp.
Sclerotinia smilacinae Durand, on rhizomes. N.Y. (1). This is perhaps *Stromatinia rapulum* (Bull. ex Fr.) Boud.

Sphaeropsis cruenta (Fr.) Gilman & Archer, leaf spot. Conn., Ind., N.Y., Va., Wis. (1); Iowa, Ohio, Wis. (2). See note on this species under *Smilacina*.
Urocystis colchici (Schlecht.) Rab., leaf smut. Iowa (2).
Uromyces acuminatus Arth. var. *magnatus* (Arth.) J. J. Davis (O,I), rust. Ill., Iowa, Minn., N. Dak., Nebr., S. Dak. (2). II and III on *Spartina* spp.
MOSAIC—unidentified virus. Maine (1).

Sansevieria, bowstring-hemp

Sansevieria spp., chiefly *S. zeylanica* Willd. and *S. trifasciata* var. *laurentii* (de Wildem.) N.E.Br.

Perennial herbs and subshrubs of Ceylon and Central Africa, respectively, with stiff, variegated leaves and beautiful flowers, adapted to house decoration as pot plants; also produce a strong fiber.

Erwinia spp. (*E. carotovora* (L. R. Jones) Holland, *E. aroideae* (Towns.) Holland), soft rot. Ariz., Fla., N.J., ?Md.
Fusarium moniliforme Sheldon, leaf spot. Fla., Mo., Wash.
Gloeosporium sansevieriae Verwoerd & du Plessis, leaf spot. Fla., P.R., ?Wash.
Glomerella cingulata (Ston.) Spauld. & Schrenk—Tex.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla.

Scilla, squill, wild hyacinth

Scilla spp., chiefly *S. hispanica* Mill. (*S. campanulata* Ait.), blue-flowered squill, and *S. sibirica* Haw., Siberian squill.

Perennial, spring-flowering bulbous plants of Europe and southwestern Asia, grown in gardens and indoors as pot plants.

Ditylenchus dipsaci (Kuehn) Filip., bulb nematode. Va.
Penicillium gladioli McCul. & Thom., blue-mold rot. On imported bulbs.
Sclerotium delphinii Welch (=*S. rolfsii* Sacc.), bulb rot. Wash.
Ustilago vaillantii Tul., flower smut. Mass., Wash.
MOSAIC — unidentified virus (*?Marmor scillearum* F.F.Sm. & Brierley). N.Y.

Smilacina, false Solomons-seal

(1) *S. amplexicaulis* Nutt.
(2) *S. racemosa* (L.) Desf., false-spikenard, Solomons-zigzag.
(3) *S. stellata* (L.) Desf.
(4) Other species.

Rhizomatous perennial herbs of woodlands: (1) in the Pacific Coast States; (2) and (3) distributed nearly throughout the United States, more frequently northward; (3) sometimes grown in wild gardens; of food value to wildlife.

Cercosporella idahoensis Sacc., leaf spot. On *S. sessilifolia* (Baker) Nutt. in Idaho. SEE ALSO *Ramularia smilacinae*.
Colletotrichum liliacearum (Schw.) Ferr., on leaves and stems. Ill., Md., N.Y., Pa., Va., W. Va. (2); Md., Va. (3). Perhaps includes *C. smilacinae* Tehon & Daniels, on leaves. Ill. (2).
Cylindrosporium smilacinae Ell. & Ev., leaf spot. Colo., Oreg. (1); Utah, Calif. (3). SEE ALSO *Ramularia smilacinae*.
Guignardia smilacinae Dearn. & House, on leaves. N.Y. (3).
?Heterosporium asperatum Mass., leaf spot. Wyo. (3).
Macrophoma spp.: SEE *Sphaeropsis*.
Mycosphaerella vagnerae Earle, on stems. Nev. (4).
Phleospora vagnerae Petr., leaf spot. Mont. (4).
Phyllosticta convallariae Pers. ex Seaver; *P. cruenta* (Fr.) Kickx; *P. smilacina* (Pk.) Dearn.: SEE *Sphaeropsis cruenta*.
Phyllosticta smilacinae Solh.—Colo. (1).
P. vagans Pk., on leaves. Mont. (1); Maine, Md., Mo., N.Y., Vt. (2).
Puccinia sessilis Schneid. (O,I), rust. Iowa, N.Y., Okla., Pa. (2); Idaho, Kans., Mich., Mont., N. Dak., Nebr., S. Dak. (3); Calif., Idaho, Wash. (4).
Ramularia smilacinae J. J. Davis, leaf spot. Mont. (1,3), Wyo. (1), Wash. (2).
R. vagnerae Barth.—Calif., Colo. (1).
Sclerotinia smilacinae Durand (*?Stromatinia rapulum* (Bull ex. Fr.) Boud.), on rhizomes. N.Y. (2).
Septoria smilacinae Ell. & G. Martin, leaf spot. General (2), Iowa (3).
Sphaeropsis cruenta (Fr.) Gilman & Archer, leaf spot. Calif., N. Mex. (1); general (2,3). A great variety of names, probably best treated for the present as synonyms of this, have been applied to different stages of this fungus. These include: *Sphaeropsis smilacina* Pk., *Phoma smilacina* (Pk.) Sacc., *Macrophoma smilacina* (Pk.) Berl. & Vogl., *Dothiorella smilacina* (Pk.) Petr. & Syd., *Phyllosticta smilacina* (Pk.) Dearn., *P. pallidior* Pk., and also the similar series on *Smilax* and other Liliaceae, in which the oldest valid name is *Sphaeria cruenta* Fr. *Ascospora cruenta* Strauss (*?Melanops cruenta* Petr.) is said to be the ascigerous stage.
Urocystis colchici (Schlecht.) Rab., leaf smut. Mont. (1,3).
Uromyces acuminatus Arth. var. *magnatus* (Arth.) J. J. Davis (O,I), rust. Minn., Wis. (2); Colo., Ill., Mont., N. Dak., Nebr., S. Dak., Wis. (3). II and III on *Spartina* spp.

Smilax, greenbrier, catbrier

Smilax spp.

Mostly thorny, evergreen, woody vines and forest weeds, occurring chiefly in the Southern States; some species furnish sarsaparilla, others decorative greens. For florists' Smilax, see *Asparagus*.

Aecidium smilacis Schw. (O,I), rust. N.C., S.C. II & III unknown.
Anthostomella spp., on dead stems. *A. ludoviciana* Ell. & Langl.—La.; *A. sepelibilis* (Berk. & Curt.) Sacc.—N.J. to Fla. and Tenn.
Ascochyta confusa Ell. & Ev., leaf spot. N.Y., Wis.
A. smilacis Ell. & Ev.—N.Y.
A. smilacis Ell. & G. Martin: SEE *Stagonospora smilacis*.
Botryosphaeria muriculata Ell. & Ev., on dead stems. Ala.
Cercospora smilacina Sacc. (*C. petersii* (Berk. & Curt.) Atk.), leaf spot. Conn. to Fla., Tex., Okla., and Nebr.
C. smilacis Thuem. (*C. mississippiensis* Tracy & Earle), leaf spot. Mass. to Fla., Tex., and Minn. on various species.
Colletotrichum smilacis Tehon, leaf spot. Ill.
Coniothyrium fuckelii Sacc., on stems. Miss., Mo.
Cylindrosporium smilacis Ell. & Ev., leaf spot. Ala.
Cytospora smilacis Cke., on exposed roots. Ga.
Dimerosporium nimbosum Ell. & G. Martin (*?Parodiopsis* sp.), on stems. Fla., S.C.

Diplodia smilacina Berk., on stems and leaves. La., Mass., Miss., Mo., R.I., Tex.
Diplodina smilacis Ell. & Ev., on stems. N.J. ?Conidial stage of *Sphaerella smilacina* Ell. & Ev. See *Mycosphaerella* sp.
Dothiorella smilacina (Pk.) Petr. & Syd., leaf spot. Mass. to Fla., La., Tex., and N. Dak. Probably includes *Sphaeropsis smilacina* Pk., *Phyllosticta smilacis* Ell. & Ev., and also Ell. & G. Martin, *P. smilacina* (Pk.) Dearn. in part, *Macrophoma smilacina* (Pk.) Berl. & Vogl., and *M. smilacis* Bub.
Gloeodes pomigena (Schw.) Colby, on stems. Ind.
Glomerella cingulata (Ston.) Spauld. & Schrenk, on leaves. Md.
Gloniopsis ellisii Cash (*Hysterium smilacis* Schw.), on stems. R.I. to Fla. and La.
Haplosporella smilacis (Ell. & Ev.) Petr. & Syd., on stems. N.Y. (*Sphaeropsis smilacis* Ell. & Ev. and *S. latispora* Dearn.; possibly conidial stage of *Physalospora obtusa* (Schw.) Cke.).
Helicobasidium purpureum (Tul.) Pat., root rot. Tex.
Heterosporium asperatum Mass., on leaves.
Hypodermopsis smilacis (Schw.) Cash (*Hypoderma smilacis* (Schw.) Rehm), on stems. N.Y. to N.C. and La.
Leptostroma smilacis Cke., on stems. N.Y., S.C.
Leptothyrium smilacis Dearn., on stems. N.Y.
Macrophoma smilacis Bub. and *M. smilacina* (Pk.) Berl. & Vogl.: See *Dothiorella smilacina.*
Meliola smilacis F. L. Stevens, black mildew. P.R.
Mycosphaerella sp., leaf spot. Ga. (on *S. glauca* Walt.). *Sphaerella smilacina* Ell. & Ev., on stems. N.J.
M. smilacicola (Cke.) Overh., leaf spot. S.C.
Myiocopron smilacis (de N.) Sacc., on stems. Mass. to Ga. and Tex.
Mystrosporium atterimum Berk. & Curt., on stems. (Said to be the conidial stage of *Dimerosporium nimbosum* Ell. & G. Martin) Fla., La., Pa.
Pestalotia clavata Cke. & Ell., leaf spot. N.Y. to Ala., Fla., La., Okla.
Pezizella oenotherae (Cke. & Ell.) Sacc., on leaves. Va.
Phlyctaena smilacis Cke., on stems. Fla., Tex.
Phoma sp., canker. Miss.
P. smilacis Boyd. & Jacz., on stems. N.Y.
Phyllachora smilacicola Chardon, black leaf spot. P.R.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Mich.
Phyllosticta spp., on leaves, sometimes causing spots. *P. smilacis* Ell. & Ev., and also Ell. & G. Martin, and *P. smilacina* (Pk.) Dearn. are listed under *Dothiorella smilacina.*
P. subeffusa (Ell. & Ev.) Tehon & Stout (*Phyllostictina subeffusa* (Ell. & Ev.) Petr. & Syd.), leaf spot. Kans., Ill., W. Va.
Physalospora disrupta (Berk. & Curt.) Sacc., on stems. Ala., Miss., S.C.
P. obtusa (Schw.) Cke., on stems. Va.
Puccinia amphigena Diet. (O,I), rust. On *S. bona-nox* L., Okla.; *S. herbacea* L., Kans., N. Dak.; *S. tamnoides* L. var. *hispida* (Muhl.) Fern., Kans., Nebr., Mich. II and III on *Calamovilfa* spp.
Puccinia macrospora (Pk.) Arth. (O,I), rust. On *S. glauca,* N.J.; *S. hispida,* Kans., N.J.; *S. rotundifolia* L., Del., N.J., N.Y. II and III on *Carex* spp.
P. smilacis Schw. (II,III), rust. On various *Smilax* spp. Mass. to Fla., Tex., and Nebr.; P.R. O and I on *Apocynum* spp.
Pyrenopeziza smilacicola Dearn. & House, on stems. N.J., N.Y.
Ramularia subrufa Ell. & Holw., leaf spot. Iowa, Miss., Nebr., Wis.
Septobasidium pseudopedicellatum Burt—On *S. auriculata* Walt., Fla.
Septogloeum subnudum Davis, leaf spot. Ill., Wis.
Septoria smilacina Dur. & Mont., on leaves. La.
S. smilacis Ell. & Ev., leaf spot. W. Va.
Sphaeropsis spp., on leaves and stems. *S. latispora* (Pk.) Dearn. and *S. smilacis* Ell. & Ev.=*Haplosporella smilacis; S. smilacina* Pk.=*Dothiorella smilacina.*
S. cruenta (Fr.) Gilman & Archer, leaf spot. On *S. herbacea, S. tamnoides* var. *hispida,* and *S. rotundifolia,* Iowa.
Stagonospora smilacis (Ell. & G. Martin) Sacc., leaf spot. Conn. to Md., N. Dak., and Tex.
?Vermicularia liliacearum West.—Ill.

Stenanthium

(1) *S. gramineum* (Ker) Morong, featherbells.
(2) *S. occidentale* A.Gray

Native perennial herbs: (1) in the Southern States, also Pa. to Ill.; (2) in the Pacific Northwest, sometimes grown in gardens.

Puccinia atropuncta Pk. & G. W. Clint. (II,III). Ga. (1); O and I on Compositae.
P. grumosa Syd. & Holw. (O,I,II,III), rust. Oreg. (2).

Streptopus, twisted-stalk

(1) *S. amplexifolius* (L.) DC., white mandarin.
(2) *S. roseus* Michx., rose mandarin.

Native woodland perennial herbs: (1) chiefly in the West, (2) in the East; sometimes grown in wild gardens.

Cercospora streptopi Dearn. & Barth. (=*C. polygonati* Rostr.), leaf spot. Wash. (1).
Colletotrichum liliacearum (Schw.) Ferr., on leaves. Wis. (2).
Puccinia sessilis Schneid. (O,I), rust. N.Y. (2).
Septoria streptopidis Pk. apud M. E. Jones, leaf spot. Mont. (2).
Tuburcinia clintoniae Komarov, leaf smut. Wis. (2).

Trillium, wakerobin, birthroot, trillium

Trillium spp.

Perennial herbs of woodlands occurring in numerous species, distribution throughout the United States; most species, in particular *T. grandiflorum* (Michx.) Salisb., occasionally grown in wild gardens.

Colletotrichum peckii (Sacc.) J. J. Davis (probably = *C. liliacearum* (Schw.) Ferr.), leaf spot. N.Y. to N.C., Ill., and Minn. *C. trillii* Tehon is probably the same.
Gloeosporium trillii Ell. & Ev., leaf spot. Calif., Oreg., Wash.
Heterosporium trillii Ell. & Ev., leaf spot. Wash.
Phyllosticta trillii Ell. & Ev., leaf spot. N.Y., Pa., Wash., Wis.
Sclerotium (*?Sclerotinia*) sp., on leaves. N.Y., Va.
S. delphinii Welch, stem rot. N.H., Pa.
Septoria recurvatum Ell. & Hals.—Ind.
S. trillii Pk., leaf spot. New England to S.C., Okla., and Wis.
Urocystis trillii Jacks., leaf smut. Idaho, Oreg.
Uromyces halstedii De Toni (O,I), rust. Ill., N.Y. II and III on *Leersia* spp.

Tulipa

T. gesneriana L., tulip.

Spring-flowering bulb of southwestern Asia, long cultivated for ornament in gardens and under glass for cutting; flowers of rich and

brilliant colors. Reports probably cover other *Tulipa* spp. grown in gardens, such as *T. clusiana* DC., lady tulip, and *T. kaufmanniana* Regel, waterlily tulip; but specific records are lacking.

Aspergillus spp. (commonly *A. niger* v. Tiegh.), black mold of bulbs. Cosmopolitan.
Botrytis tulipae (Lib.) Lind, Botrytis blight, fire. General except the Far South and Southwest. Distinct, at least physiologically, in the broad sense, from *B. cinerea* Pers. ex Fr. which sometimes follows this and other forms of leaf and flower injury.
Ditylenchus dipsaci (Kuehn) Filip., leaf nematode. N.Y.
Erwinia carotovora (L.R.Jones) Holland, soft rot. Wash.
Fusarium sp., basal rot. Okla., Wash.
Gloeosporium thuemenii Sacc. f. *tulipae* Tompkins & Hans., anthracnose. Calif.
Penicillium spp., blue-mold rot of bulbs. Cosmopolitan. *P. corymbiferum* Westling and *P. cyclopium* Westling have been identified as active agents of decay.
Phytophthora cactorum (Leb. & Cohn) Schroet., stem rot, flower spot. Calif., Ill., ?Iowa, N.J., Pa., S.C., Wash.
Pythium intermedium d By., on roots. ?Calif.
P. ultimum Trow, secondary bulb rot. Wash.
Rhizoctonia solani Kuehn, root and stem rot, bulb rot. Mass., N.Y., Wash.
R. tuliparum Whet. & J.M.Arth. (*Sclerotium tuliparum* Kleb., not Schlecht.), gray bulb rot. Northeastern States, Pacific States.
Rhizopus stolonifer (Ehr. ex Fr.) Lind, mushy rot (usually following sunscald or warm, damp storage). Cosmopolitan.
Sclerotinia sp. (*?sclerotiorum* (Lib.) d By.), white bulb rot. Maine, Ohio, Wash.
S. sativa Drayton & Groves, bulb rot. ?Md., N.Y.
Sclerotium rolfsii Sacc. (including *S. delphinii* Welch), bulb and stem rot. Calif., Conn., Ga., N.Y., Oreg.
MOSAIC, BREAKING — virus (*Marmor tulipae* Holmes, Tulipa virus 1 K.M.Sm.; including *M. mite* Holmes, Tulipa virus 2 K.M.Sm.). General.
NECROSIS — tobacco necrosis virus (*Marmor lethale* Holmes, Nicotiana virus 11 K.M.Sm.), necrotic spot. Wis.
CHALKING (hard rot, stone disease) — probably physiological and related to immaturity of, or mechanical injury to, bulbs when dug, or to storage conditions; often accompanied by *Penicillium* spp. Occasional, usually in heavy, retentive soils.
TOPPLE, WET STEM—physiological, attributed to excessive warmth and moisture in forcing, perhaps a form of mineral (calcium) deficiency. Occasional in greenhouse culture, rare in the open.

Uvularia, bellwort, merrybells

(1) *U. grandiflora* Sm.
(2) *U. perfoliata* L.
(3) *U. sessilifolia* L., wildoats.

Small perennial herbs of woodlands in the Eastern and Central States, sometimes grown in wild gardens.

Colletotrichum liliacearum (Schw.) Ferr., on leaves and stems. Va. (2,3).
Diplodia uvulariae J.J.Davis: SEE *Sphaeropsis.*
Guignardia sp., on leaves. Ga. (2).
Phyllosticta cruenta (Fr.) Kickx., *P. oakesiae* Dearn. & House, and *P. uvulariae* Gall.: SEE *Sphaeropsis.*
Puccinia sessilis Schneid. (O,I), rust. Iowa, Minn., Mo., Wis. (1); N.C. (2); Del., Md., Minn., Miss., N.Y., Wis. (3).
Sphaeropsis cruenta (Fr.) Gilman & Archer, leaf spot. Ill., Iowa., Mo., Va., Wis. (1); Ind. (2); Conn., N.Y., Wis. (3). Included here are reports under various *Phyllosticta* spp.; perhaps also *Diplodia uvulariae.*
Uromyces acuminatus Arth. var. *magnatus* (Arth.) J. J. Davis (O,I), rust. Miss., Wis. (3).

Veratrum, false-hellebore

(1) *V. californicum* Durand
(2) *V. viride* Ait., white false-hellebore, itchweed, Indian poke.
(3) Other species.

Tall, somewhat pubescent, perennials of wet meadows and woodlands: (1) in the Pacific States, (2) chiefly in the Eastern and Central States: sometimes grown in wild gardens; of food value to wildlife.

Ascochyta veratrina Ell. & Ev., leaf spot. Wash. (1).
Cercosporella terminalis Pk., leaf spot. N.Y. (2).
C. veratri Pk.—N.Y. (2).
Colletotrichum liliacearum (Schw.) Ferr., on leaves and stems. Del., N.J. (2).
Cylindrosporium veratrinum Sacc. & Wint., leaf spot. N.Y., Va., Wash. (2); Calif., Utah (3).
Diplodia veratri Earle, on stems. Colo., Nev. (3).
Leptosphaeria veratri Earle, on stems. Colo. (3).
Marssonina veratri (Ell. & Ev.) Magn., on leaves. Colo., Wash. (1).
Phyllachora melanoplaca (Desm.) Sacc., tar spot. N.Y. (2).
Phyllosticta melanoplaca Thuem., leaf spot. Calif., Conn. (2); Calif., Colo., Idaho, Utah (3).
Puccinia atropuncta Pk. & G. W. Clint. (II,III), rust. Tenn., W. Va. (2); Mo., N.C., Okla., Tenn., Va. (3). O and I on Compositae.
P. veratri (DC.) Duby (II,III), rust. Calif., N. Mex., Oreg., Wash. (1); Conn., N.H., N.J., N.Y., Pa., Va., W. Va. (2); Colo., Idaho, Mont. (3). O and I on *Epilobium* spp.
Pyrenopeziza sp., on stems. Colo. (3).
Sclerotinia veratri Cash & Davidson, on stems. Colo. (3).
Sclerotium sp., on stems. Alaska (3).

Xerophyllum

(1) *X. asphodeloides* (L.) Nutt., turkeysbeard.
(2) *X. tenax* (Pursh) Nutt.

Coarse perennial herbs of dry woodlands or open ground: (1) in the Eastern States, (2) in the Pacific and Rocky Mountain States; sometimes grown in wild gardens; the leaves used in basketry.

Asterina xerophylli Ell., on old leaves. N.J. (1).
Hendersonia xerophylli Ell., on old leaves. N.J. (1).
Leptosphaeria hysterioides Ell. & Ev., on old leaves. Oreg., Wash., ?Idaho (2).
L. xerophylli Ell.—N.J. (1).
Leptostroma xerophylli Petr., on leaves. Idaho (2).
Mycosphaerella xerophylli Syd., on dead stems. Idaho (2).
Pleospora xerophylli Petr., on old leaves. Idaho (2).
Puccinia atropuncta Pk. & G. W. Clint. (II,III), rust. Miss. (1).

Yucca

I. Arborescent Species

(1) *Yucca aloifolia* L., aloe yucca, Spanish-bayonet.
(2) *Y. brevifolia* Engelm., Joshua-tree.
(3) *Y. elata* Engelm., soaptree.
(4) Other species.

Woody-stemmed, non-frost-hardy plants of arid ground: (1) in the Gulf States, where it is grown for ornament; (2) and (3) in the Southwest; (2) sometimes grown in gardens; (3) furnishes food for livestock and wildlife and is a source of fiber, soap, and honey.

Anthostomella nigro-annulata (Berk. & Curt.) Sacc., on dead leaves. S.C. (1).
Cercospora concentrica Cke. & Ell., leaf spot. Tex. (2).
Coniothyrium concentricum (Desm.) Sacc., leaf spot. General (1).
Diplodia circinans Berk. & Br., on leaves. ?Fla. (1).
?Fusarium lateritium Nees ex Fr., on leaves. Fla. (1). Conidial stage of *Gibberella baccata* (Wallr.) Sacc.
Kellermannia anomala (Cke.) Hoehn. (*K. yuccaegena* Ell. & Ev.), leaf blight. Fla. (1), Calif. (2).
K. major Dearn. & Barth.—N. Mex. (3).
Phyllosticta sp. (*?yuccogena* Ell. & Ev.), leaf spot. Tex. (2). *P. maculicola* Hals.—N. Mex. (3).
Pleospora thuemeniana Sacc., on old leaves. Ga., Miss., S.C. (1).
Sphaerodothis pringlei (Pk.) Th. & Syd., on leaves. Fla. (1), Calif. (4).
Stagonospora gigantea Heald & Wolf, leaf spot. Calif. (4).
Stomatogena agaves (Ell. & Ev.) Th. & Syd., on leaves. Calif. (4).
Torula maculans Cke., leaf mold. Calif. (2).
T. herbarum Lk. ex Cda.—La. (1).

II. Nonarborescent Species

(1) *Yucca filamentosa* L., Adams-needle, silk-grass.
(2) *Y. glauca* Nutt., soapweed.
(3) *Y. gloriosa* L., moundlily, Spanish-bayonet.
(4) Other species.

Coarse perennials, acaulescent or short-trunked, mostly frost-hardy: (1) and (3) in the Southeastern and Gulf States, (2) in the Plains States except the Far North; grown for ornament in gardens and as pot plants.

Aecidium yuccae Arth. (O,I), rust. Nebr. (2). II and III unknown.
Alternaria tenuis Auct. and *?A. tenuissima* (Fr.) Wiltsh., secondary leaf rot. W. Va. (1).
Anthostomella nigro-annulata Berk. & Curt., on dead leaves. Fla., Ga., N.C. (1).
Cercospora concentrica Cke. & Ell., leaf spot. Conn., N.J., Okla., Tex. (1); Iowa (3); Ga., Tex., P.R. (4).
C. floricola Heald & Wolf, flower blight. On *Y. rupicola* Scheele in Tex. (According to C. Chupp=*C. concentrica*.
Colletotrichum liliacearum (Schw.) Ferr., on leaves. N.J., Pa., W. Va. (1).
Coniothyrium concentricum (Desm.) Sacc., leaf spot. General (1,2,3).
Cylindrosporium angustifolium Ell. & Kell., leaf spot. Kans., Miss., Okla. (2); Tex. (4).
Diaporthe arctii (Lasch) Nits., on leaves. Ga. (1).
Didymosphaeria clementsii Sacc., & D. Sacc., on dead leaves. Colo., Wyo. (2).
D. yuccogena (Cke.) Sacc.—Calif. (2).
Diplodia circinans Berk. & Br., leaf spot. Tex. (4). Conidial stage of *Botryosphaeria agaves* (P. Henn.) Syd.
Epicoccum asterinum Pat., leaf spot. Tex. (4).
Gloeosporium yuccogenum (*yuccaegenum*) Ell. & Ev., leaf spot. Mo. (1), Tex. (4).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Kellermannia anomala (Cke.) Hoehn. (*K. yuccaegena* Ell. & Ev.), secondary leaf blight. Kans., Nebr., Okla., Tex. (1); general (2); Miss. (3); Calif., Tex. (4).
K. major Dearn. & Barth.—Calif. (4).
Leptosphaeria filamentosa Ell. & Ev., on leaves. N.J. (1), Tex. (4).
L. obtusispora Speg.—Ala., Miss. (3).
Meloidogyne sp., root knot nematodes. Oreg. (4).
Mycosphaerella sp. (*Sphaerella yuccae* Ell. & Ev.), on leaves. Ala. (1), N. Dak. (2).
M. sphaerelloides (Sacc.) Petr., on old leaves. Okla., Wash. (2).
Neottiospora yuccifolia J. G. Hall, leaf spot. Ga., Iowa, Wash. (4).
Pestalozziella yuccae Karst., secondary leaf spot. Tex. (4).
Phaeosphaerella weiriana Petr., on old leaves. Wyo. (2).
Phomatospora argyrostigma (Berk.) Sacc., on old leaves. Ala., Va. (1); Ohio (4). *P. disrupta* (Berk. & Curt.) Cke.—Miss. (1). Probably *Physalospora*.
Phyllosticta yuccogena (*yuccaegena*) Ell. & Ev., on leaves. Ala., Fla. (4).
Physalospora uvispora (Cke.) Sacc., on stems. Tex. (4).
Plowrightia circumscissa Tracy & Earle (=*Phragmodothis circumscissa* (Tracy & Earle) Th. & Syd.)—Fla. (3).
Sclerotium rolfsii Sacc., stem rot. Md. (1).
Septoria sp.—Ga., N.C., Tex. (4).
S. yuccae Sacc., on leaves. Pa. (3).
Sphaerodothis pringlei (Pk.) Th. & Syd., on leaves. Ariz., Calif., N. Mex. (on *Y. schottii* Engelm.).
Sphaeropsis filamentosa Cke., on old leaves. S.C. (1).
Stagonospora macrospora (Dur. & Mont.) Sacc., on leaves. Colo. (4).
Systremma sp., on leaves. Colo. (2). Reported as *?Phyllachora yuccae* Ell. & Ev.
Thyridaria conspicua (Griff.) Petr., on old leaves. Colo., Mont. (2).
Torula maculans Cke., leaf mold. Ariz., Calif., S.C., Tex., Wyo. (4).

Zigadenus

(1) *Z. elegans* Pursh (including *Z. glaucus* Nutt.), white-camass, alkaligrass.
(2) *Z. gramineus* Rydb.
(3) *Z. venenosus* S.Wats.
(4) Other species.

Perennial herbs of meadows and plains: (1) distributed nearly throughout the United States, (2) and (3) in the Rocky Mountain and Pacific States; all poisonous to some degree, (2) and (3) especially so, and a frequent cause of stock poisoning; some species occasionally grown for ornament.

Puccinia atropuncta Pk. & G. W. Clint. (II,III), rust. Iowa, Mo., N. Dak., Wis. (1); Tex. (4). O and I on Compositae.

Puccinia grumosa Syd. & Holw. (O,I,II,III), rust . Colo., Mont., Wyo. (2); Colo. (4).

Urocystis flowersii Garrett, leaf smut. Utah (1).

Uromyces zygadeni Pk. (O,I,II,III), rust. Colo., Iowa, Mont., Wyo. (1); Mont., Wyo. (2); Mont., Tex., Wash., Wyo. (3); Calif., Colo., Kans., Nev., Tex., Utah (4).

LINACEAE

Linum, flax

I. Flowering Species

(1) *Linum flavum* L.
(2) *L. grandiflorum* Desf.

Perennial herb of southern Europe (1) and an annual of North Africa (2); grown for ornament.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif. (1).
Rhizoctonia solani Kuehn, damping-off. Ill. (2).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Calif. (1).

II. Introduced Species

(1) *Linum usitatissimum* L., common flax.

Annual herb of supposed Asiatic origin (or perhaps derived from *L. angustifolium* Huds. of the Mediterranean region), cultivated since antiquity for fiber and oil; in the United States grown chiefly for seed in California, Iowa, Kansas, Minnesota, Montana, North Dakota, and South Dakota.

Alternaria spp., boll disease, leaf spot, seedling blight. Minn., N. Dak., Tex., Wash. Sometimes reported as *A. tenuis* Auct., and probably secondary, although pathogenic races (to seedlings) have been demonstrated; the latter may belong to *A. linicola* Groves & Skolko, identified in Manitoba, Canada, but not yet reported in the U.S. SEE ALSO *Pleospora*.
Aphanomyces cladogamus Drechs., on roots. Wis.
Botrytis cinerea Pers. ex Fr., boll rot. Calif.
Colletotrichum lini (Westerdijk) Toch. (*C. lini* Bolley, *C. linicola* Pethyb. & Lafferty), anthracnose, seedling blight. Ariz., Calif., Iowa, Mich., Minn., Mont., N. Dak., S. Dak., Tex., Wis.
Curvularia geniculata (Tracy & Earle) Boed., root rot, probably secondary; also isolated from seed. Mich.
C. inaequalis (Shear) Boed.—Ill.
Cuscuta sp., dodder. Kans., Mo., Tex.
C. epilinum Weihe—N.J., Ohio, Pa.
?Erysiphe cichoracearum DC. (conidial stage), powdery mildew. Minn.
Fusarium equiseti (Cda.) Sacc., secondary root rot. N. Dak.
F. oxysporum Schlecht. f. *lini* (Bolley) Snyd. & Hans., wilt, "flax sickness." General, but largely overcome by resistant varieties of flax.
F. scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., secondary root rot. N. Dak.
Helminthosporium sp. and *H. sativum* Pam., King, & Bakke, seedling blight. Minn.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Melampsora lini (Pers.) Lév. (O,I,II,III), rust, sometimes stem canker. General. The race on common flax is distinguished as f. sp. *liniperda* Koern.; the physiologic races comprising it do not, in general, infect native *Linum* sp., nor do the races on these infect common flax.
Meloidogyne spp., root knot. Tenn.
Mycosphaerella linorum (Wr.) Garcia Rada, pasmo, rust-blotch. Ariz., Calif., Iowa, Kans., Mich., Minn., N. Dak., S. Dak., Tex., Wis. Distinctness from *M. linicola* Naoumoff, an earlier name, awaits confirmation.
Penicillium sp., secondary root rot. Wash.
Phlyctaena linicola Speg.: SEE *Mycosphaerella linorum*.
Pleospora herbarum (Pers. ex Fr.) Rab. (*Stemphylium botryosum* Wallr.), on seed. Minn., N. Dak.
Polyspora lini Lafferty, browning, stem-break. Ariz., Iowa, Mich., Minn., N. Dak., Oreg. Recent studies by N. H. White in Australia indicate that the fungus widely known under this name is a variety, *lini*, of *Pullularia pullulans* (d By.) Berkhout (=*Anthostomella pullulans* F. T. Bennett), a cosmopolitan saprophyte; the stem-browning ascribed to it may be primarily an effect of adverse environmental factors.
Pyrenochaeta terrestris (Hans.) Gorenz, J. C. Walker, & Larson, secondary root rot. Minn., N. Dak., S. Dak.
Pythium spp., root rot, seedling blight. Ariz., Iowa, N. Dak.
P. aphanidermatum (Edson) Fitz. identified in Ariz.; *P. debaryanum* Hesse in Iowa.
Rhizoctonia solani Kuehn, damping-off, root rot. Calif., Iowa, Minn., N. Dak., Tex.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Ariz., Calif., Oreg., Tex.
Sclerotium delphinii Welch, stem rot. Conn.
S. rolfsii Sacc.—Tex.
Septoria linicola (Speg.) Garassini: SEE *Mycosphaerella linorum*.
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Minn., N. Dak.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif.

CHLOROSIS—physiological, attributed to excessive soil moisture or alkalinity. Minn., N. Dak. Corrected by $FeSO_4$ spray in Minn.

HEAT CANKER—stem injury at soil level caused by high temperature. Occasional throughout the Plains States; also Calif., Oreg., Wis.

III. Native Species

(1) *Linum lewisii* Pursh, prairie flax.
(2) *L. rigidum* Pursh
(3) *L. sulcatum* Riddell
(4) *L. virginianum* L., woodland flax.

Annual or perennial herbs of the prairies and western plains (1,2,3) or of woodlands in the East (4); of food value to wildlife.

Cercospora lini Ell. & Ev., leaf spot. Tex. (1,3), Del. (4).
Melampsora lini (Pers.) Lév. (O,I,II,III), rust. N. Dak. to Tex., Calif., and Alaska (1); Kans., Mont., N. Dak., Nebr. (2); Iowa, N. Dak., Nebr., S. Dak., Wis., Wyo. (3); N.Y. (4).
Peronospora lini Schroet., downy mildew. Iowa (3). Described as *P. lini* Ell. & Ev.; identity with the European species not confirmed.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,3).
Pyrenopeziza californica Sacc., on stems. Calif. (1).
Rhizoctonia solani Kuehn, root rot. Tex. (1,3).

LOASCACEAE

Mentzelia, blazing-star

(1) *M. decapetala* (Pursh) Urban & Gilg.
(2) *M. floridana* Nutt.
(3) *M. laevicaulis* Torr. & Gray
(4) Other species.

Mostly perennial, sometimes woody, herbs of the Western and Southwestern States; (2) also in Florida; often grown for ornament.

Diplodina stevensii Sacc. (nomen nudum), on stems. N. Dak. (1).
Phyllosticta mentzeliae Ell. & Kell., leaf spot. Kans., Tex. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Okla., Tex. (3,4).
Puccinia aristidae Tracy (O,I), rust. Ariz., Colo. (4). II and III on *Aristida* and *Distichlis*.
Rhizoctonia solani Kuehn, root and stem rot. N.J.
Septoria mentzeliae Ell. & Kell., leaf spot. Kans. (1); Wash. (3); Kans., Tex. (4).
Uredo floridana Syd. (II), rust. Fla. (2).

LOBELIACEAE

Lobelia

I. Native Species

(1) *Lobelia cardinalis* L., cardinalflower.
(2) *L. inflata* L., Indian-tobacco.
(3) *L. siphilitica* L., blue lobelia.
(4) Other species.

Perennial (1,3), or annual (2) herbs of the Eastern and Central States and southward; some are cultivated for ornament (1,3); several are useful to wildlife; (2) is sometimes a weed in cultivated ground.

Cercospora effusa (Berk. & Curt.) Ell. & Ev., leaf spot. Tex. (1,3,4), Iowa (3).
C. lobeliae Kell. & Swing., leaf spot. ?Ill. (1); ?Ind., Md., Tex. (2); Ind., Kans., Tex. (3); Ala., Tex. (4).
C. lobeliicola (*lobeliaecola*) Solheim—Kans., Tenn., Tex. (1); ?Tex., Va. (2); Ill., Iowa, Tex., Va., Wis. (3); Pa. (4). This has been reported as *C. effusa* (Berk. & Curt.) Ell. & Ev. and has been much confused with *C. lobeliae*.
Colletotrichum lobeliae F. L. Stevens—P.R. (4).
Entyloma lobeliae Farl., leaf smut. Maine to Pa., Mo., and Wis. (2); Pa., P.R. (4).
Gloeosporium hawaiense Thuem., leaf spot. T.H. (4).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. N.Y. (1), Nebr. (4).
Phyllosticta bridgesii Speg., leaf spot. Ind. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,3,4).
Puccinia lobeliae Gerard (III), rust. Mich. (1); N.Y. to Va., Ark., and Wis. (3); same range as for (3) and also N.C., Tex., and Wash. (4).
Rhizoctonia solani Kuehn, root rot. N.Y., Ohio.
Sclerotium delphinii Welch, stem rot. N.J.
Septoria lobeliae Pk., leaf spot. Occasional, from Maine to Va., Tex., and Wis. (*). A form identified as *S. lobeliae-syphiliticae* P. Henn. also is reported in N.Y. (3).

Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Tex. (1,4).
Spotted wilt—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Tex. (1,4).

II. Introduced Species

(1) *L. erinus* L., edging lobelia.
(2) Other species.

Annual herb of South Africa (1) and other introduced species (2); mostly grown for ornament.

Amazonia asterinoides (Wint.) Th., black mildew. T.H. (2).
Asterina fimbriata Kalchb. & Cke. and *A. lobeliae* F. L. Stevens & Ryan, black mildew. T.H. (2).
Botrytis cinerea Pers. ex Fr., gray mold.
Calothyriopeltis metrosideri F. L. Stevens & Ryan, black mildew. T.H. (2).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. ?Fla., Md.
Pythium debaryanum Hesse, damping-off. Mass., N.Y. (1,2).

LOGANIACEAE

Buddleia

Buddleia spp., butterflybush.

Several species, especially *B. davidi* Franch., summer-lilac, are cultivated in regions not requiring a high degree of winter hardiness; other species native in range 11,17,20.

Cladosporium heugelinianum Thuem., "scab." On *B. asiatica* Lour., Va. Perhaps this also reported as *Cladosporium* sp. in Del.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Ala., Miss., Tex.
Phoma sp. (*Phomopsis buddleiae* Grove), stem canker. Ariz.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Gelsemium, yellow-jessamine

G. sempervirens (L.) Ait., Carolina jessamine, evening-trumpetflower.

Twining shrub or vine. Range 28,29,30; also cultivated as an ornamental.

Asterina stomatophora Ell. & G.Martin, black spot. Fla.
Capnodium grandisporum Ell. & G. Martin, sooty mold. Miss., Tex.
Nectria rubicarpa Cke., on stems. Ala., S.C.
Phyllosticta gelsemii Ell. & Ev., leaf spot. N.J., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot.
Physalospora obtusa (Schw.) Cke.—Ga.
P. rhodina (Berk. & Curt.) Cke., on stems. S.C.

LORANTHACEAE

Phoradendron

Phoradendron spp., false mistletoe.

Woody-stemmed plants parasitic on trees, chiefly *P. flavescens* (Pursh) Nutt., American mistletoe, occurring from New Jersey and southern Indiana to Florida, Texas, and California; used for Christmas greens. Other species occur in the Far West.

Asterina (*Englerulaster*) *phoradendricola* Stevenson & Pollack, parasitic on *P. flavescens*—Fla.
Asterinella phoradendri Ryan, black leaf spot. P.R.
Cuscuta exaltata Engelm., dodder. Tex.
Diplodia phoradendri Cke.: See *Sphaeropsis visci.*
Exosporium phoradendri Tharp, leaf spot. Tex.
Macrophoma phoradendri Wolf: See *Sphaeropsis visci.*
Nectria cinnabarina Tode ex Fr., twig blight. Tex.
Phyllosticta phoradendri Bonar, leaf blight. Calif. (on var. *macrophyllum* Engelm.).
Sphaeropsis visci (West.) Archer, leaf blight. Fla., S.C., Tex.
Uredo phoradendri Jacks., (II), rust. Calif., Oreg.
Valsaria phoradendri (Berk. & Curt.) Berl. & Vogl., on stems.
?Volutella weiriana Syd., on leaves. Calif.

LYTHRACEAE

Cuphea

(1) *C. petiolata* (L.) Koehne, clammy Cuphea, blue waxweed.

Annual herb of the Eastern and South Central States, useful to wildlife.

(2) *C. platycentra* Lem., cigarflower.

Mexican annual, grown under glass for ornament.

Botrytis cinerea Pers. ex Fr., gray mold. Occasional in greenhouses (2).
Erysiphe polygoni DC., powdery mildew. Md., Va. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md. (2).
Rhizoctonia solani Kuehn, root rot. Ill. (2).
Septoria maculifera Sacc., leaf spot. N.Y., Pa., Va., W. Va. (1).
Uredo cupheae P. Henn. (II), rust. P.R. (1).

Decodon, swamp-loosestrife

D. verticillatus (L.) Ell., waterwillow, water-oleander.

Perennial herb of swamps and ponds in the Eastern and Central States and southward; a wildlife food plant.

Cercospora nesaeae Ell. & Ev., leaf spot. Del., N.J. *C. decodontis* Tehon & Daniels, reported in Ill., is doubtfully distinct.
Phyllosticta nesaeae Pk., leaf spot. N.J., N.Y., Ohio, Vt.
Puccinia minutissima Arth. (O,I), rust. Mass. to N.J., Ind., and Wis.; also Fla. II and III on *Carex* spp.

Lagerstroemia

L. indica L., crapemyrtle, and *L. speciosa*, (L.) Pers., queen crapemyrtle.

Flowering shrub or small trees of China; *L. indica* cultivated, zone 7; *L. speciosa* cultivated in southern Florida.

Botryosphaeria ribis Gross. & Dug., on branches. Ala.
Cercospora sp., black spot, blotch. Fla., Tex.
C. lythracearum Heald & Wolf (*Mycosphaerella lythracearum* Wolf), leaf spot. Tex.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Erysiphe lagerstroemiae E. West, powdery mildew. Md. to Fla. and Tex., also Okla., P.R. Perfect stage collected only in Fla.; probably the same fungus, reported as *Oidium* sp., collected throughout range of host.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Ala.
Phyllosticta lagerstroemiae Ell. & Ev., on leaves, ?tip-blight. La., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. Ala., Fla.
Rhizoctonia ramicola D. A. Roberts, thread blight. Fla.
Uncinula australiana McAlp.—Reported in La., T.H. American specimens are probably *Erysiphe lagerstroemiae.*
Chlorosis—manganese deficiency. Fla.

Lythrum, loosestrife

(1) *L. alatum* Pursh., winged loosestrife.
(2) *L. salicaria* L., purple loosestrife.
(3) Other species.

Mostly perennial herbs: native (1) or widely naturalized (2) in the Eastern and Central States; grown in wild gardens and useful to wildlife; (2) is a minor honey plant.

Cercospora lythri (West.) Niessl, leaf spot. Wis. (1).
?Mycosphaerella lythracearum Wolf, leaf spot. Miss. (3). Probably the *Cercospora* stage, as the perfect stage is known only on *Punica granatum* L.
Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot. N.Y. (2), Mich. (3).
Rhizoctonia solani Kuehn, root rot. Ill.
Septoria lythrina Pk., leaf spot. Kans., N.Y., (1,2); Wis. (1).
Synchytrium lythrii Cook, leaf gall. La. (1).

MAGNOLIACEAE

Illicium

I. floridanum Ellis, anisetree.

Evergreen shrub. Range 29 and 30, grown for ornament. Several Asiatic species are also cultivated.

Asteridium illicii Tr. & Earle, on leaves. Miss.
Capnodium footii Berk. & Desm., sooty mold. Miss.
Cephaleuros virescens Kunze, green scurf. La., S.C.
Laestadia illiciicola Tr. & Earle, on leaves. Miss.
Lembosia illiciicola Tr. & Earle, black mildew. Ala., Miss.

Liriodendron

L. tulipifera L., tuliptree, yellow-poplar.

A beautiful deciduous forest tree. Range 21, 22,23,24,25,26,27,28,29; also cultivated in several horticultural forms. *L. chinense* (Hemsl.) Sarg., of China, is sometimes cultivated in the South.

Angelina rufescens (Schw. ex Fr.) Duby—Ga.
Anthostomella sp.—Ga.
Armillaria mellea Vahl ex Fr., root rot. Va.
Asteroma liriodendri Cke., on leaves. Md., S.C.
Botryosphaeria ribis Gross. & Dug., also var. *chromogena* Shear, N.E.Stevens, & M.S. Wilcox, on branches. Fla., Ga., Pa.
Calospora sp.—Ga.
Camarops polyspermum (Mont.) Mill.—Ga.
Capnodium elongatum Berk. & Desm. sooty mold. Cosmopolitan.
Ceratostomella spp. (*C. multiannulata* Hedgc. & Davidson and *C. pluriannulata* Hedgc.), blue wood stain. Va. to Gulf States. SEE ALSO *Endoconidiophora.*
Cercospora liriodendri Ell. & Harkn.: SEE *Mycosphaerella tulipiferae.*
Chlorosplenium aeruginosum (Oud.) de N., green wood stain. Cosmopolitan.
Collybia velutipes (Curt.) Fr., white spongy trunk rot. W. Va.
Cylindrocladium scoparium Morg., collar rot of seedlings. N.J.
Cylindrosporium cercosporioides Ell. & Ev., leaf spot. Md., W. Va.
Cytospora leucostoma Sacc. var. *magnoliae* D. Sacc., on branches. Md., Va.
Daedalea extensa Pk. and *D. unicolor* Bull. ex Fr., wood rot of logs or sometimes standing trees.
Daldinia vernicosa (Schw.) Ces. & de N., wood rot. Cosmopolitan.
Diaporthe eres Nits., on dead branches. Md.
Diplodia liriodendri Pk., on branches. N.Y., W. Va.
Dothiorella sp., canker. Pa.
D. minor Ell. & Ev., on branches. Md., W. Va.
Ectostroma liriodendri Kunze ex Fr. (also *Xyloma* and possibly *Rhytisma liriodendri* Wallr. in part), tar spot. Widespread. (Probably mostly insect injury, with fungi, when present, secondary.)
Endoconidiophora coerulescens Münch: SEE *E. virescens.*
Endoconidiophora virescens Davidson, blue wood stain, sap streak. Va. to Gulf States, N.C. Shown by Davidson to be different from the European species *E. coerulescens* Münch, under which name the American fungus was formerly reported.
Erysiphe polygoni DC., powdery mildew. Widespread.
Fomes applanatus (Pers. ex Fr.) Gill., white-mottled heart rot. Occasional.
Gloeodes pomigena (Schw.) Colby, on branches. Ind., W. Va.
Gloeosporium liriodendri Ell. & Ev., leaf spot. Conn. to N.J. and Tex.
Graphium rubrum Rumbold, pink wood stain. Ohio to Miss. and S.C.
Hydnum erinaceus Bull. ex Fr., wood rot. Va.
Hypholoma sp., butt rot. Va.
Hypoxylon spp.—Ga.
Lasiosphaeria ovina (Pers. ex Fr.) Ces. & de N.—Ga.
L. pezizula (Berk. & Curt.) Sacc., wood stain. S.C.
L. strigosa (Alb. & Schw. ex Fr.) Sacc.—Ga.
Lecanidion atratum (Hedw. ex Fr.) Endl. and *L. clavisporum* (Berk. & Br.) Sacc., on scale insects. Ga.
Lenzites betulina L. ex Fr. and *L. saepiaria* Wulf. ex Fr., wood rot of logs and timber. Cosmopolitan.
Leptothyrium liriodendri Cke., on leaves. S.C., W. Va.
Lophodermium punctiforme (Fr.) Fckl.—Ga.
Mycosphaerella liriodendri (Cke.) Woron., leaf spot. Ga., Mich., N.Y.
M. tulipiferae (Schw.) Higgins, leaf spot. Middle Atlantic to Gulf States. This report and one preceding based on same imperfect stage called *Depazea tulipiferae* Schw. and *Phyllosticta liriodendri* Cke.
Myxosporium spp. (*M. coloratum* (Pk.) Sacc., *M. liriodendri* Dearn. & House, *M. longisporum* Edg.), on twigs, ?canker. N.Y.
M. tulipiferae Died., on twigs. Iowa.
Nectria sp., canker. W. Va. to N.C. and Tenn.
N. magnoliae Lohman & Hepting, on bark and branches. Conn. to N.C., Ohio, and Tenn.
Pezizella oenotherae (Cke. & Ell.) Sacc.—Ga.
Phoma tulipiferae Schw., on leaves. N.Y., Pa.
Phyllactinia corylea Pers. ex Karst., powdery mildew. N.Y. to Ala and Mo.
Phyllosticta liriodendrica Sacc., leaf spot. Widespread. Conidial stage of *Mycosphaerella liriodendri.*
P. macrospora Ell. & Ev., on leaves. Pa., Va., W. Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. Md. to Ga. and Tenn.
Pleurotus ostreatus Jacq. ex Fr., sapwood rot. Occasional.
Polyporus spp. (*P. adustus* Willd. ex Fr., *P. caesius* Schrad. ex Fr., *P. cinnabarinus* Jacq. ex Fr., *P. dichrous* Fr., *P. graveolens* (Schw.) Fr., *P. hirsutus* Wulf. ex Fr., *P. lacteus* Fr., *P. pubescens* Schum. ex Fr., *P. pulchellus* Schw., *P. resinosus* Schrad. ex Fr., *P. sulphureus* Bull. ex Fr., *P. tulipiferus* (Schw.) Overh., *P. versicolor* L. ex Fr., *P. zonalis* Berk.), wood rot of logs or sometimes standing trees.
Poria canescens Karst.—Great Lakes region.
Pratylenchus pratensis (De Man) Filip., in roots. Tex.
Ramularia liriodendri Ell. & Ev., leaf spot. Ala., Del.
Rhizoctonia solani Kuehn, seedling blight. Ohio, Va.
Rhytisma liriodendri Wallr. (*Xyloma*), black leaf spot. Calif., Tex. SEE ALSO *Ectostroma.*
Schizophyllum commune Fr., sapwood rot. Cosmopolitan.
Stereum spp. (*S. gausapatum* Fr., *S. rameale* Schw., *S. umbrinum* Berk. & Curt., and others), wood rot of logs and slash.
Torula ligniperda (Willk.) Sacc., pink wood stain. Widespread.

Magnolia

(1) *M. acuminata* L., cucumbertree.

Large, deciduous tree. Range 22,24,25,27,28, 29,30; fruit, when young, resembles a small cucumber.

(2) *M. fraseri* Walt., Fraser magnolia, mountain magnolia or ear-leaved umbrella-tree.

Large, deciduous tree. Range 27,28.

(3) *M. grandiflora* L., southern magnolia.

Large, evergreen tree. Range 28,29,30.

(4) *M. liliflora* Desr., including variety *nigra* Rehd.

Large shrub of Southern States to zone 5.

(5) *M. soulangeana* Soul., saucer magnolia.

Large shrub or small tree of hybrid origin (*M. denudata* × *liliflora*) cultivated in several horticultural forms, hardy in zone 5 but often suffering injury from spring frosts.

(6) *M. virginiana* L. (*M. glauca* L.), sweet-

bay, laurel magnolia (inclusive of the southern variety *australis* Sarg.)

Evergreen tree or large shrub. Range 27,28, 29,30; also cultivated.

(7) Other species.

Acanthostigma berenice (Berk. & Curt.) Sacc., on leaves. S.C. to Fla. and La. (7).

Alternaria tenuis Auct.—leaf spot. Tex. (7).

Asterina comata Berk. & Rav.: SEE *Trichodothis comata.*

Botryosphaeria ribis Gross. & Dug. var. *chromogena* Shear, N. E. Stevens, & M. S. Wilcox, on branches. Ala., Fla. (7).

Cephaleuros virescens Kunze, green scurf. General (3); Southern States (7).

Cercospora magnoliae Ell. & Harkn. Fla., Va. (3); N.J. (6).

Cladosporium fasciculatum Cda., on leaves, ?leaf spot. Ga. to Tex. (3); Md., N.J., N.Y. (6); widespread (7).

Colletotrichum sp., ?leaf spot, also on twigs. Fla., Ga., S.C. (3); N.J. to Fla. (7).

Coniothyrium sp., leaf spot. Tex. (7).

C. olivaceum Bon., leaf spot. Tex. (3).

Cucurbitaria congesta Cke. & Ell., on dead branches. N.J. (7).

Cytospora tumulosa Ell. & Ev., on branches. W. Va. (2).

Daedalea ambigua Berk.—Ala. (7).

Daldinia concentrica (Bolt. ex Fr.) Ces. & de N. and *D. vernicosa* (Schw.) Ces. & de N., wood rot. Cosmopolitan (7).

Diaporthe sp.—Wash. (7).

D. binoculata (Ell.) Sacc., on dead branches. N.C., N.J., (6); N.C., N.J., N.Y., W. Va. (7).

D. eres Nits. (*D. magnoliae* Ell. & Ev.), on branches. Ga. (6); Ala., Md., N.J., N.Y. (7). SEE ALSO *Phomopsis* sp.

Didymosphaeria magnoliae J. H. Miller & E. E. Thompson, on dead leaves. Ga. (6).

Dimerosporium magnoliae Tracy & Earle, sooty mold. Tex. (3,7).

Dothidella concaviuscula (Ell. & Ev.) Th. & Syd., on dead branches. N.J. (6).

Epicoccum nigrum Lk., leaf spot. Tex. (3).

Exophoma magnoliae Weedon, leaf spot. Fla., Tex. (3); Fla., Tex. (7).

Fomes spp., wood rots, sometimes on living trees:

F. applanatus (Pers. ex Fr.) Gill.—Md. (7).

F. fasciatus (Sw. ex Fr.) Cke., heart rot on living trees. (3).

F. geotropus Cke., brown pocket heart rot on living trees. La., N.Y. (3); Fla., lower Mississippi Valley, N.J. (7).

F. ohiensis Berk.—Va. (7).

F. pinicola (Sw. ex Fr.) Cke.—(7).

Gloeodes pomigena (Schw.) Colby, on branches. Ind. (7).

Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf spot. Ala., Fla., Ga., La., Miss., S.C., Tex. (3).

Gnomonia magnoliae Ell., on fallen leaves. N.J., Ga. (6).

Guignardia magnoliae (Schw.) J. H. Miller, on leaves. Fla., Ga., N.J. (6).

Hendersonia magnoliae Sacc., leaf spot. Va. (3).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Heterosporium magnoliae Weedon, leaf spot. Fla., N.C., Tex. (3).

Irene araliae Spreng. ex Syd., black mildew. Miss. (6).

Leptothyrella langloisii (Ell. & Ev.) Sacc., on leaves. La. (3).

Lophodermium maculare Fr.—Fla.

Macrophoma sp., on branches. Okla. (3).

Melanconium magnoliae Ell. & Ev., on dead trunk. N.J. (6).

Meliola amphitricha Fr., black mildew. Gulf States (3,6,7), Ga. (6), P.R. (7).

M. magnoliae F. L. Stevens—Ga. (6); Gulf States, P.R. (7).

Meloidogyne sp., root knot nematodes.

Micropeltis alabamensis Earle, black leaf spot. Ala. (6).

Microsphaera alni DC. ex Wint., powdery mildew. Md., Pa. (1); Ala. (4); sometimes present but not severe (5).

Mycosphaerella sp.—Ga. (6).

M. annulata (Cke.) Miles, on leaves. Fla., La., Miss. (6).

M. glauca (Cke.) Miles—Miss., S.C. (6).

Nectria sp., canker. W. Va. (1).

N. cinnabarina Tode ex Fr., on branches. N.Y., W. Va. (7).

N. magnoliae Lohman & Hepting, canker. Tenn., W. Va. (2); N.J., W. Va. (7).

Nummularia discreta (Schw.) Tul., on branches. Occasional (7).

Pellicularia koleroga Cke., thread blight. S.C. (3).

Pestalotia guepini Desm., on leaves. General (3); Southern States (7).

Pezizella oenotherae (Cke. & Ell.) Sacc. (*Sclerotiopsis concava* (Desm.) Shear & Dodge), on branches. N.C. (1).

Phaeostigme picea (Berk. & Curt.) Syd.—Ga. (6).

Phoma melaleuca Berk. & Curt., on branches. (7).

P. pedunculi Ell. & Ev., on stems. W. Va. (2).

Phomopsis sp. (=*Diaporthe magnoliae* Ell. & Ev.) Fla. (6); N.Y., Pa., Va. (7).

P. viridarii Grove.—(7).

Phyllactinia corylea Pers. ex Karst., powdery mildew. Ohio, Pa. (1); (2).

Phyllosticta cookei Sacc., leaf spot. W. Va. (1); S.C. to Tex., Fla. (3); Fla., Miss., N.J., N.Y. (6); N.Y. and W. Va. to Gulf States, also Calif. (7).

P. glauca Cke.—Ala., Fla., N.C., S.C. (6); S.C. to Ala. and Fla. (7).

P. magnoliae Sacc., large leaf spot. W. Va. (2); N.J., N.Y., Ohio (5); Fla., N.J. (6); N.J. and N.Y. to Gulf States (7).

P. terminalis Ell. & G. Martin—N.J. (7).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).

Physalospora fusca N. E. Stevens, on branches. Fla. (7).

P. obtusa (Schw.) Cke.—Va. to S.C. (7).

Polyporus spp. (*P. adustus* Willd. ex Fr., *P. cinnabarinus* Jacq. ex Fr., *P. crocatus* Fr., *P. distortus* (Schw.) Fr., *P. hirsutus* Wulf. ex Fr., *P. spumeus* Fr., *P. tulipiferus* (Schw.) Overh., *P. velutinus* Pers. ex Fr., *P. westii* Murr.), wood rots, sometimes on living trees (7).

Poria spp., various rots as follows:

P. ambigua Bres.—(7).

P. cocos Wolf, tuckahoe, on roots. Fla. (7).

P. incrassata (Berk. & Curt.) Burt, dry rot of timber. (7).

P. mollusca Pers. ex Bres., wood rot. (7).

P. vaporaria Fr., wood rot. (7).

P. versipora (Pers.) Rom., wood rot. (7).

Pratylenchus pratensis (De Man) Filip., in roots of *M. kobus* DC. (7).

Protostegia magnoliae (Rav.) Sacc., on leaves. S.C. to Fla. and Tex. (7).

Pseudomonas syringae Van Hall, bacterial leaf spot. Ill. (5).

Rhizoctonia solani Kuehn, seedling blight. N.J. (7).

Sclerotinia gracilipes (Cke.) Sacc., on flower parts, petal rot. Md. (6).

Septobasidium langloisii Pat. and *S. tenue* Couch, on scale insects infesting bark. Gulf States (6).

S. leprieurii (Mont.) Pat.—Fla. (7).

Septoria magnoliae Cke., leaf spot. S.C. to Fla. and Tex. (3).
S. niphostoma Berk. & Curt.—Fla., N.C., S.C. (3).
Sirodesmium ellipticum (Cke.) Sacc., on leaves. S.C. (6).
S. stictophyllum (Cke.) Sacc., on leaves. S.C. (3).
Sphaceloma sp., leaf spot. Ga., Miss.
Sporodesmium rude Ell., on leaves. N.J. (6).
Stereum spp. (*S. albobadium* (Schw.) Fr., *S. hirsutum* Willd. ex Fr.)—(7).
Torula ligniperda (Willk.) Sacc., pink wood stain. Occasional (1).
Trichodothis comata (Berk. & Rav.) Th. & Syd., black mildew. Southern States (3), Gulf States (7).
Tryblidiella rufula (Spreng. ex Fr.) Sacc., on twigs. Gulf States (7).
Tubercularia sp. (*?Nectria cinnabarina* Tode ex Fr.), twig blight. Mich. (5).
Valsa ambiens Pers. ex Fr., on branches. N.Y. (6).
Venturia applanata Ell. & G. Martin, on leaves. Fla. (6).

MALPIGHIACEAE

Banisteria

(1) *B. laurifolia* L.
(2) *B. tomentosa* Desf.

Shrubs, or trees, often climbing, of tropical America.

Meliola rectangularis F. L. Stevens, black mildew. P.R. (1).
Phyllachora banisterae F. L. Stevens & Dalbey, on leaves. P.R. (2).

Bunchosia

B. cornifolia H.B.K.

Erect shrubs or trees of tropical America.

Meliola crenata Wint., sooty mold. C.Z.

Byrsonima

Byrsonima spp., including *B. crassifolia* (L.) DC., *B. lucida* (Sw.) DC., and *B. intermedia* Juss.

Trees of tropical America and southern Florida; astringent bark of *B. crassifolia* used medicinally.

Cronartium notatum (Arth.) Arth. & Johnst., rust (II,III). P.R.
Meliola byrsonimae F. L. Stevens, black mildew. C.Z., P.R.

Malpighia

M. glabra L., Barbados-cherry.

Tropical American shrub, bearing edible fruit; sometimes cultivated in Florida.

Cephaleuros virescens Kunze, green scurf. P.R.

Stigmaphyllum

Stigmaphyllum spp.

Woody vines of tropical America, sometimes grown for ornament.

Morenoella decalvans (Pat.) Th. var. *stigmatophylli* Ryan, black mildew. P.R.
Phyllachora inconspicua Chardon, on leaves. P.R.
Puccinia inflata Arth., (O,II,III), rust. P.R., V.I.

MALVACEAE

Abutilon

I. Field Species

(1) *Abutilon incanum* (Link) Sweet, Indian mallow.
(2) *A. theophrastii* Medic., velvetleaf.

Perennial of sandy plains in Texas to Arizona (1); or an annual of southern Asia, widely naturalized in waste ground near cities throughout the United States (2). Both species furnish food for wildlife.

Alternaria sp. (*?abutilonis* (Pass.) Schwarze), leaf spot. Tex. (1,2); Ill., Ind., N.J., N.Y., Wis., W. Va. (2).
Cercospora abutilonis Tehon & Daniels, leaf spot. Ill. (2).
C. althaeina Sacc.—Tex. (1,2), Kans. (2).
Cladosporium herbarum Pers. ex Fr., secondary leaf spot. N.Y. (2).
Colletotrichum malvarum (A. Braun & Casp.) Southworth, leaf spot. Iowa (2).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Macrophomina phaseoli (Maubl.) Ashby, stem rot. Ill. (2).
Meloidogyne sp., root knot nematodes. ?Fla. (2).
Phyllosticta althaeina Sacc., leaf spot. Tex. (1,2); Kans., W. Va. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Puccinia heterospora Berk. & Curt. (III), rust. Ariz., Okla., Tex. (1,2); Kans., Md., Mo., Nebr. (2).
MOSAIC—unidentified virus. Iowa, Kans., Md., N.Y. (2).

II. Ornamental Species

(1) *Abutilon striatum* Dicks. clone *thompsonii* Veitch, variegated abutilon.
(2) Other species.

Shrubby perennials mostly of Central or Southern American origin, grown for ornament as house plants in the North and in the open in warm regions.

Asterina diplocarpa Cke., black mildew. P.R. (2).
Cercospora brachypoda Speg., leaf spot. P.R. (2); also on *A. hirtum* (Lam.) Sweet.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Ala (2).
Puccinia heterospora Berk. & Curt. (III), rust. Fla. to Ariz., also P.R., T.H., West Indies (2).
P. malvacearum Bert. (III), rust. T.H. (on *A. molle* Sweet).
Verticillium albo-atrum Reinke & Berth., wilt. N.J. (2).
MOSAIC, INFECTIOUS CHLOROSIS—virus (*Marmor abutilon* Holmes, Abutilon virus 1 K.M.Sm.). Universal in (1) and related variegated forms.

Althaea

(1) *A. cannabina* L.
(2) *A. ficifolia* (L.) Cav., Antwerp hollyhock.
(3) *A. rosea* (L.) Cav., hollyhock.

Biennial or perennial herbs: (1,2) cultivated for ornament throughout the United States; (3), of China, often escaped and locally naturalized.

Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Wis. (3).
Alternaria spp. (probably chiefly *A. tenuis* Auct.), secondary leaf spot. Conn. to N.C., Nebr., and Minn. (3).
Ascochyta althaeina Sacc. & Bizz., leaf spot. N.Y. (1); Ind., Md., N.J., N.Y., Pa., W.Va. (3).
A. parasita Fautr.—Conn., Del., Md., W.Va., ?Wis. (3).
Cercospora althaeina Sacc., leaf spot. Eastern and Central States to Ala., Tex., and S.Dak. (3).
C. kellermanii Bub., leaf spot. Ind., Iowa, Minn., Mo., Ohio, N.J., ?Md. (3).
Colletotrichum malvarum (A. Braun & Casp.) Southworth, anthracnose, seeding blight. N.Y. to Miss., Tex., and Iowa (3).
Endophyllum tuberculatum Ell. & Kell. (III), rust. Colo., Kans., Nebr., Okla. (3).
Eryspihe cichoracearum DC. (conidial stage), powdery mildew. Calif. (1,3), Miss. (3).
E. polygoni DC.—Iowa (3).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Fla., Kans., Miss., Okla., Tex. (3).
Myrothecium roridum Tode ex Fr., leaf spot. Md. (3).
Nectria cinnabarina Tode ex Fr., branch canker. Okla. (on undesignated species).
Phyllosticta althaeina Sacc., leaf spot, stem canker. Ala., N.J., N.Y., Ohio, Pa., W.Va. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (3).
Physalospora obtusa (Schw.) Cke., on dead stems. Ala. (3).
Phytophthora megasperma Drechs., crown rot. Md., Va. (3).
Pratylenchus pratensis (De Man) Filip., root nematode. Tex. (3).
Pseudomonas solanacearum E.F. Sm., bacterial wilt. N.Y., ?W.Va. (3).
Puccinia heterospora Berk. & Curt. (III), rust. Calif., Kans., Tex., P.R., V.I. (3).
P. lobata Berk. & Curt. (III), rust. Ariz., N.Mex., Tex. (3).
P. malvacearum Bert. (III), rust. Calif., Colo., N.Y., Oreg. (2); general (3).
P. schedonnardi Kell. & Swing. (O,I), rust. Kans., Miss., N.Dak., Nebr., ?N.J., (3)
P. sherardiana Koern. (O,III), rust. Calif. (3).
Rhizoctonia microsclerotia Matz, web blight. Tex., P.R. (3).
Sclerotinia sclerotiorum (Lib.) d By., crown rot. Mont., N.J. (3).
Sclerotium rolfsii Sacc., southern blight. Ark. (3).
Septoria malvicola Ell. & G.Martin (*S. fairmanii* Ell. & Ev.) leaf spot. Mich., Minn., N.Y., Ohio, Okla., Vt., Wis.
Xanthomonas solanacearum (E.F.Sm.) Dows.: See *Pseudomonas solanacearum.*
Mosaic—unidentified virus. P.R. (3).

Anoda

(1) *A. cristata* (L.) Schlecht.
(2) *A. hastata* Cav.

Annuals of Mexico and South America; (1) also occurring naturally from Texas to Arizona, a food plant for wildlife; both grown for ornament.

Oidium erysipheoides Fr., powdery mildew. N.Mex. (2).
Puccinia sp. (*?heterospora* Berk. & Curt.), rust. Tex. (1).

Callirhoë, poppy-mallow

(1) *C. alcaeoides* (Michx.) A.Gray
(2) *C. digitata* Nutt.
(3) *C. involucrata* (Torr. & Gray) A.Gray
(4) Species not determined or not designated.

Low perennial herbs of sandy plains in the Southern and Central States, sometimes grown for ornament.

Cercospora althaeina Sacc., leaf spot. Kans., Nebr., Tex. (3). Var. *praecincta* J.J.Davis—Ill., Wis. (on *C. triangulata* (Leavenw.) A.Gray.)
Endophyllum tuberculatum Ell. & Kell. (III), rust. Kans. (1); Ind., Kans., Nebr., Okla., Tex. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Puccinia interveniens (Pk.) Bethel (O,I), rust. Nebr. (1); Tex. (2); N.Y. (4). II and III on *Stipa* spp.
P. schedonnardi Kell. & Swing. (O,I), rust. Kans., Nebr. (1); Okla. (2); Colo., Kans., Nebr., Okla., Tex., Utah. (3). II and III on various grasses.
Synchytrium australe Speg., on leaves. Kans., Tex. (3).
Vermicularia sparsipila Ell. & Kell., leaf spot. Tex. (2,3).
Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (on *C. papaver* (Cav.) A.Gray.).

Gossypium, cotton

I. Cultivated Cotton

(1) *Gossypium hirsutum* L., upland cotton.
(2) *G. barbadense* L., Sea Island cotton.
(3) *G. herbaceum* L., Levant cotton.

Annual or short-lived perennial (1) of tropical America, principal source of cultivated varieties of cotton but greatly influenced by hybridization with (2), (3), and other species. Records specifically applicable to (2) and (3) are separately indicated when available. In general, however, all records pertain to (1). In addition to the Cotton Belt, Virginia, Florida, Missouri, New Mexico, Arizona, and California produce commercial quantities of cotton.

Aecidium desmium Berk. & Br.: See *Phakospora desmium.*
A. gossypii Ell. & Ev.: See *Puccinia stakmanii.*
Aerobacter cloacae (Jordan) Bergey et al., reported as a cause of fiber deterioration.
Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Ariz., Okla., Tex.
Alternaria spp., leaf blight (perhaps secondary, as a sequel to potassium deficiency or bacterial spot), boll rot, lint stain, seed mold, ?seedling blight. Eastern Cotton States to Ariz. and Okla. (1,2,3). *A. tenuis* Auct. is most important secondary boll rot organism in Okla. *A. gossypii* of auths. (*?A. gossypii* (Jacz.) Nisikado et al.) has no nomenclatural standing, probably is *A. tenuis* Auct., as is also *A. gossypina* (Thuem.) Hopkins. *A. macrospora* Zimm. (*A. longipedicellata* (Reichert) Snow-

den) has not been reported in the U. S. but is known from Trinidad, B. W. I.

Aphelenchoides parietinus (Bast.) Steiner and *Aphelenchus avenae* Bast., nematodes associated with seedling stem lesions (soreshin) but not a primary factor. Reported from Ark. and S.C., doubtless general.

Arthrobotrys superba Cda., associated with fiber deterioration. C.Z.

Ascochyta gossypii Woron., leaf blight, stem canker, boll rot. Va. to Ga., Ala., La., Tex., and Okla.; "wet weather canker"—Ga.; "wet weather blight" —Ala.

Aspergillus spp., boll rot, lint stain, fiber deterioration. *A. niger* v. Tiegh., as a cause of boll rot (black mold), "smut blight," is reported especially in the Southwest from Tex. and Okla. to Calif., but it is cosmopolitan as associated with fiber deterioration. Additional species reported on fiber include: *A. flavus* Lk. ex Fr., *A. fumigatus* Fres., *A. glaucus* Lk., *A. nidulans* (Eidam) Wint., *A. ochraceus* Wilhelm, *A. penicilloides* Speg., *A. repens* (Cda.) d By., *A. ustus* (Bainier) Thom & Church., *A. versicolor* (Vuill.) Tiraboschi, and others.

A. luchuensis Inui, on roots, ?secondary root rot. Tex.

Bacillus gossypina Stedm., ?boll rot. Ala.

Botryodiplodia theobromae Pat.: SEE *Physalospora rhodina.*

Botryosphaeria ribis Gross. & Dug., boll rot, also on stems. Ala., Ga., La., Miss., S.C., Tex. (1,3). Includes reports as: ?*Dothiorella botryosphaeroides* Sacc.—S.C.; ?*B. horizontalis* (Berk. & Curt.) Sacc. (which includes *B. subconnata* (Schw.) Cke.)—S.C.; also as *Dothiorella* sp., *D. major* Ell. & Ev., *B. berengeriana* de N., *B. fuliginosa* (Moug. & Nestl.) Ell. & Ev. SEE ALSO *Physalospora.*

Brachysporium sp., boll rot., seedling blight. Okla., Tex., fiber deterioration—Fla. SEE ALSO *Curvularia* and *Helminthosporium.*

Cephalosporium acremonium Cda. ex Fres., fiber deterioration. Fla.

Cercospora althaeina Sacc., leaf spot. Ill., N.C., S.C., Tex.

C. gossypina Cke.: SEE *Mycosphaerella gossypina.*

Cerotelium desmium (Berk. & Br.) Arth.: SEE *Phakopsora desmium.*

Chaetomium spp., fiber deterioration. *C. globosum* G.Kunze ex Fr. is commonly cited in this connection; likewise, *C. elatum* G.Kunze ex Fr., *C. funicola* Cke., and numerous other species.

Choanephora conjuncta Couch., on fallen flowers. Ga.

C. cucurbitarum (Berk. & Rav.) Thaxt., boll rot. N.C., Tex.

Cladosporium herbarum Pers. ex Fr., secondary boll rot and leaf spot, seed mold, fiber deterioration. Cosmopolitan.

Colletotrichum gossypii Southworth: SEE *Glomerella gossypii.*

Cunninghamella spp. (*C. echinulata* Thaxt., *C. elegans* Lendner, and others), fiber deterioration. Fla., C.Z.

Curvularia spp. (*C. lunata* (Wakk.) Boed., *C. maculans* (Bancroft) Boed., and other species), fiber deterioration. Fla., C.Z.; boll rot—Okla.

Diplodia spp., boll rot, fiber deterioration. Ariz., Ark., Fla., Ga., S.C., Tex. In part the following species, and probably others.

D. gossypina Cke., *D. natalensis* P.Evans.: SEE *Physalospora rhodina,* or ?*P. abdita.*

Diplodiella (=?*Diplodia*) *cowdellii* (Berk. & Br.) Sacc., fiber deterioration. Fla.

Fusarium spp., boll rot, pink mold, seedling blight. General in the eastern Cotton Belt, occasional in the Southwest (1,3). The following species are reported: *F. equiseti* (Cda.) Sacc., *F. scirpi* Lambotte & Fautr. and its var. *acuminatum* (Ell. & Ev.) Wr., *F. semitectum* Berk. & Rav., (these four=*F. roseum* Lk. in the sense of Snyder & Hansen), and *F. solani* (Mart.) Appel & Wr. Also, fungi isolated from seed, bolls, or seedlings of cotton and found to be pathogenic to cotton seedlings in inoculation experiments (Phytopath. 32:233) include, in addition to several of the preceding species: *F. chlamydosporum* Wr. & Reinking (=*F. tricinctum* (Cda.) Sacc. of Snyder & Hansen), *F. equiseti* var. *bullatum* (Sherb.) Wr., *F. moniliforme* Sheldon, and *F. vasinfectum* Atk.

F. moniliforme Sheldon, boll rot, seed mold, dry root rot. General in humid parts of the Cotton Belt, usually as a secondary invader; boll rot—Okla., Tex.; also seedling blight—La., Tex.

F. oxysporum Schlecht. f. *vasinfectum* (Atk.) Snyd. & Hans., Fusarium wilt. General in the Cotton Belt, rare in the Southwest (1,2,3).

Glomerella gossypii Edg., anthracnose, pink boll rot, seedling blight. General in the Southeastern and Gulf States to eastern Tex. and Okla., and in Ky. Mo., Tenn., also Guam, P.R., and T H. (1,2,3).

Helminthosporium sp., boll rot, seedling blight. Okla., Tex.

H. gossypii Tucker, leaf and boll spot. P.R.; black stem. Tex.

Hendersonia sarmentorum West., and *Hendersonia* sp., fiber deterioration. Fla.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Humicola fusco-atrata Traaen (=*Mycogone puccinioides* (Preuss) Sacc.), fabric deterioration. Md.

Hyponectria gossypii (Schw.) Ell. & Ev., on capsules. S.C.

Leptosphaeria spp., fiber deterioration. Fla.

Macrophomina phaseoli (Maubl.) Ashby, stem blight. Va. to Ga., Tex., and Okla.; boll rot. Okla.

Macrosporium gossypinum Thuem.: SEE *Alternaria tenuis.*

M. nigricantium Atk.: SEE *Pleospora nigricantia.*

Meloidogyne spp., root knot nematodes. General from Va. to Fla., Tex., and Mo., also Ariz. and Calif. (1,2,3).

Memnoniella echinata (Rivolta) L.D.Galloway, fiber deterioration. Fla., Md., Tex., C.Z., Guam.

Monilia crassa Shear & Dodge and *M. sitophila* (Mont.) Sacc. (=*Neurospora crassa* Shear & Dodge and *N. sitophila* Shear & Dodge), fiber deterioration. C.Z.

Mucor spp., fiber deterioration. Cosmopolitan.

Mycosphaerella areola Ehrlich & Wolf, areolate mildew, frosty blight. Va. to Fla., Tex., and Okla., also Calif., Ill., P.R. (1,2). The conidial stage is commonly known as *Ramularia areola* Atk. but was first described as *Cercosporella gossypii* Speg.

M. gossypina (Atk.) Earle (*Cercospora gossypina* Cke.), leaf spot. Va. to Fla., Tex., and Okla., also Ill., P.R. (1,2,3).

Myrothecium verrucaria (Alb. & Schw.) Ditmar ex Fr. (*Metarrhizium glutinosum* Pope), fiber deterioration. Fla., Md.; secondary leaf spot. Miss. Of little significance as a destroyer of cotton fabrics in the field but active in laboratory tests.

Nectria cinnabarina Tode ex Fr., on stems. Ga., Tex.

Nematospora coryli Pegl., internal boll disease. Calif.

N. gossypii Ashby & Nowell, associated with a similar disease, is reported on (2) in P.R. and elsewhere in the West Indies.

Neocosmospora vasinfecta E.F.Sm., on dead stems. Ala., Ark., N. C., S. C., Tex., and other Southern States but many reports under this name refer to *Fusarium vasinfectum* Atk., an unrelated organism.

Nigrospora oryzae (Berk. & Br.) Petch, on seed. ?Tex.

N. sphaerica (Sacc.) Mason, seed mold, fiber deterioration. C.Z.

Olpitrichum carpophilum Atk.: SEE *Rhinotrichum macrosporum.*

Ozonium auricomum Lk.—Tex.
O. texanum Neal & Wester, on dead roots and stems. Tex.
Pellicularia filamentosa (Pat.) Rogers (*Rhizoctonia solani* Kuehn), seedling blight, leaf blight. Reported in this stage in S.C., but occurrence in *Rhizoctonia* stage is general.
Penicillium spp., secondary boll rot, fiber deterioration. Cosmopolitan.
P. luteum Sopp., ?secondary root rot. Tex.
Pestalotia spp. (*P. gracilis* Kleb. and others), fiber deterioration. Fla., C.Z. (*P. palmarum* Cke. is an active cellulose destroyer in New South Wales.)
Pestalozziella gossypina Atk., secondary boll rot. Ala., Okla., Tex.
Phakopsora desmium (Berk. & Br.) Cumm. (II,III), rust. Fla., P.R. (1,2). O and I unknown.
Phlyctaena gossypii Sacc., on stems. Ala., S.C.
Phoma sp., seedling blight. Miss., Tex.
?P. corvina Rav., stems. S.C.
P. gossypii Sacc., on stems. Ala., Ark., Ga., Miss., S.C., Tex.
Phomopsis sp., stem disease. Tex.
Phyllosticta gossypina Ell. & G.Martin, leaf spot. Ala., La., Miss., N.C., S.C., Tex., P.R. (1,3).
P. malkoffii Bub., leaf spot. Tex., P.R. (1,2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Ark., Calif., La., N.Mex., Okla., Tex. (1,2,3).
Physalospora rhodina (Berk. & Curt.) Cke. (*P. gossypina* N.E.Stevens, *Diplodia gossypina* Cke.), Diplodia boll rot, seedling blight; also associated with fiber deterioration. Va. to Fla., Tex., and Okla., especially the lower Mississippi Valley, also Ill., Md., P.R. (1,3). *P. abdita* (Berk. & Curt.) N.E. Stevens, reported on cotton stems in Fla., La., and Tex., may also be connected with *Diplodia* spp. causing boll rot.
Phytophthora parasitica Dast., boll rot. P.R., ?Fla. (1,2).
Pleospora nigricantia Atk. (*?P. herbarum* (Pers. ex Fr.) Rab.), on leaves affected with "black rust," in association with *Macrosporium nigricantium* Atk. The latter is a *Stemphylium* (*?S. botryosum* Wallr.); it develops as a sequel to "rust" (mineral deficiency) and occurs throughout the Cotton Belt (1,3).
Pratylenchus pratensis (De Man) Filip., root browning and necrosis. Ga., N.C., S.C.
Puccinia stakmanii Presley (O,I), rust. Ariz., N.Mex., Okla., Tex. (1); Ariz., Tex. (2,3). II and III on *Bouteloua* spp.
Pullularia pullulans (d By.) Berkhout, fiber deterioration. Cosmopolitan.
Pythium spp., damping-off. Gulf States, N.C., Tenn. *P. debaryanum* Hesse reported in Ala., Miss., N.C., Tex.; *P. ultimum* Trow in N.C., S.C.
Ramularia areola Atk.: SEE *Mycosphaerella areola.*
Rhinotrichum macrosporum Farl., secondary boll rot. Southeastern and Gulf States. (1,3). Also reported as *Olpitrichum macrosporum* (Farl.) Sumstine (*O. carpophilum* Atk.) and *Oidium macrosporum* (Farl.) Linder.
R. tenellum Berk. & Curt., secondary boll rot. Ala., Fla., La., S.C. Reported also as *Oidium tenellum* (Berk. & Curt.) Linder.
Rhizoctonia solani Kuehn, damping-off, soreshin, leaf blight. General (1,2,3). SEE ALSO *Pellicularia filamentosa.*
Rhizopus stolonifer (Ehr. ex Fr.) Lind (*R. nigricans* Ehr.), boll rot. Gulf States and Ariz., Calif., Okla. This fungus and *Aspergillus niger* v. Tiegh. are the most aggressive of the secondary boll rot fungi.
Schizophyllum commune Fr., root and stem rot. (?secondary). Calif., La., Tex.
Sclerotium bataticola Taub.: SEE *Macrophomina phaseoli.*
Sclerotium rolfsii Sacc., southern blight. Gulf States, Ariz., Ark., Okla.
Septoria gossypina Cke., on stems. Miss., S.C. (1,3).
Stachybotrys atra Cda., fiber deterioration. Md., C.Z.
Stemphylium: SEE *Pleospora.*
Thielavia sp. (*?basicola* Zopf), fiber deterioration. Fla.
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot, internal collar rot. Ala., Ariz., Miss., Tex. 1(3).
Trichoderma viride Pers. ex Fr., secondary boll rot, seed mold, fiber deterioration. Cosmopolitan.
Trichothecium roseum Lk. ex Fr., secondary boll rot, seed mold. Ala., Calif., N.Mex., Tex.
Uredo gossypii Lagh.: SEE *Phakopsora desmium.*
Valsa gossypina Cke. (*?V. decorticans* Fr.), on stems. Ga., S.C. (1,3). Also reported in the conidial stage as *Cytospora* sp. in Tex.
Verticillium albo-atrum Reinke & Berth., wilt. Increasingly prevalent since the first report on cotton 25 years ago; has become a major problem in irrigated areas of Ariz., Calif., N.Mex., and the Rio Grande Valley of Tex., also in sections of the Mississippi Delta in Ark., Tenn., and Miss.; widely distributed also in central Tex. and La.; local occurrence recently reported in Ala. and in South Atlantic States from Va. to Ga. (1,2,3). Some evidence that fungus is indigenous in virgin soils in some areas (Ariz., Ark.). Reported as *V. dahliae* Kleb. in Miss.
Xanthomonas malvacearum (E.F.Sm.) Dows., angular leaf spot, bacterial blight and boll rot, black arm. General (1,2,3). Causes primary boll rot; most of the fungus rots are secondary to this and to insect punctures.
RING SPOT—perennial delphinium ring spot virus (*Annulus delphinii* Holmes) causing systemic necrotic spotting. Calif. (experimental).
CRAZY TOP (acromania)—cause unknown, believed physiological; associated with impervious soil and irregular moisture supply. Ariz., Calif. (1,2).
CRINKLE-LEAF—physiological, attributed to calcium deficiency and manganese toxicity and is associated with acid soils. Ark., La.
LIGHTNING INJURY—Tex.
MOSAIC—in part nutritional (see "Rust"), in part hereditary; noninfectious and presumed to be of genetic origin. Tex.
ROOT CONSTRICTION—?physiological. Ariz., Calif., Tex.
"RUST," POTASH HUNGER—yellowing, browning, and premature shedding of foliage resulting from deficiency of potassium, sometimes also of magnesium. On light and depleted soils throughout the Cotton Belt, especially in dry years. Early references to "mosaic" and "yellow leaf blight" pertain to this; "black leaf rust" ensued when affected foliage was overgrown by secondary fungi.
SAND DROWN—Marginal and interveinal chlorosis and leaf reddening, sometimes premature defoliation resulting from magnesium deficiency. Especially in the Southeastern and Midsouthern States; also Ark., La., Miss., and Okla.
STIGMATOMYCOSIS—internal boll rot, lint staining, and boll shedding caused by certain boll-feeding insects (*Dysdercus* spp., *Nezara viridula* L., and others), together with fungi (*Nematospora* and others). Reported in Ariz. and prevalent in the West Indies.

II. Breeding and Other Cultivated Species

(1) *Gossypium arboreum* L., Asiatic tree cotton.
(2) *G. mexicanum* Todaro, Mexican cotton.
(3) *G. peruvianum* Cav., Peruvian cotton.
(4) *G. thurberi* Todaro, Arizona wild cotton.

Shrubby perennials, occasionally planted for

ornament; (4) a native shrub of southern Arizona and Mexico.

Diplodia theobromae (Pat.) Nowell, dieback. Tex. (4).
Phakospora desmium (Berk. & Br.) Cumm. (II,III), rust. Fla. (1,2,3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).
Xanthomonas malvacearum (E.F.Sm.) Dows., bacterial blight. Okla. (1,3), Ariz. (4).

Hibiscus

I. Nonarborescent Species

(1) *Hibiscus esculentus* L., okra.

Annual herb of Old World tropics, cultivated mostly in the South for edible pods.

(2) *H. palustris* L. (*moscheutos* L.), rose-mallow.

Robust perennial herb of marshy habitats ranging from Massachusetts to Florida and Missouri, principal source of garden mallows.

(3) *H. sabdariffa* L., roselle, Jamaica sorrel.

Annual of Old World tropics, grown in warm countries for edible fleshy calyx.

(4) *H. trionum* L., flower-of-an-hour.

Annual herb of Africa, naturalized in the United States; used ornamentally.

(5) Other species, such as *H. grandiflorus* Michx. and *H. lasiocarpos* Cav.

Tall perennial herbs; wildlife-food plants.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Miss. (2).
Alternaria sp. (*?A. tenuis* Auct.), secondary leaf spot. Fla., Ohio, Pa., S.C., Utah, Va. (1). Most of the reports of *Macrosporium* spp. on this host belong here. *M. hibiscinum* Thuem. is probably *Alternaria brassicae* (Berk.) Sacc.; *M. spadiceum* Thuem. =*A. tenuis*.
Ascochyta abelmoschi Harter, pod spot. Ga., Md., N.J., N.Y., Pa. (1); leaf spot. N.Y. (2).
A. gossypii Woron.—Ark. (5).
Botryosphaeria ribis Gross. & Dug., dieback. T.H. (2).
Botrytis sp., pod rot. N.Y. (1).
B. cinerea Pers. ex Fr., gray-mold blight. Md. (5).
Cercospora althaeina Sacc.—Tex. (4).
C. hibisci Tracy & Earle, leaf spot. N.C. to Fla. and Tex., P.R. (1); Tex. (3). Reported also as *C. althaeina* Sacc., of which this is perhaps a synonym; reports of *C. brachypoda* Speg. may also belong here. *C. brachypoda* is older than *C. hibisci* but described on different species.
C. kellermanii Bub., leaf spot. Ind. (2).
C. malayensis F.L.Stevens & Solheim, leaf spot. Va. to Fla., Tex., and Okla., also N.J. (1).
?C. polymorpha Bub.—Tex.
Choanephora conjuncta Couch, on fallen flowers. Ga. (1).
C. cucurbitarum (Berk. & Rav.) Thaxt., blossom blight. Fla., Ga., Tex., P.R. (1).
Colletotrichum gloeosporioides Penz., anthracnose, pod spot. Fla. (1,3).
C. hibisci Pollacci (*?C. gloeosporioides* Penz.), dieback. Tex.
Diaporthe arctii (Lasch) Nits., on stems. Ga. (1).
D. phaseolorum (Cke. & Ell.) Sacc. var. *sojae* (Lehman) Wehm., on pods. Ga. (1).
Diplodia theobromae (Pat.) Nowell, on stems. Ala. (1).
Erysiphe cichoracearum DC., powdery mildew. Conn., N.C., N.J., Pa. (1).
Fusarium sp., fruit rot, stem rot. Fla., P.R. (3).
Fusarium sp. (usually reported as *F. oxysporum* Schlecht. and sometimes as f. *vasinfectum* (Atk.) Snyd. & Hans.), wilt. Conn. to Fla., Tex., and Ariz. (1).
F. solani (Mart.) Appel & Wr. f. *radicicola* (Wr.) Snyd. & Hans., root rot. T.H. (3).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. Tex. (1).
Meloidogyne spp., root knot nematodes. General in Southern States, also Ariz., Kans., N.Mex., T.H. (1); Tex., T.H. (3).
Microsphaera euphorbiae (Pk.) Berk. & Curt., powdery mildew. Ala., Fla., P.R. (3).
Ophiobolus consimilis Ell. & Ev., on dead stems. La. (1).
Periconia pycnospora Fres.—Tex. (on *H. grandiflorus*).
Phoma okra Cke., on stems. La., S.C., Guam (1).
Phyllosticta hibiscina Ell., & Ev., leaf spot. Ala., Ill., N.C., N.J., Okla. (1); Conn., Fla., La., Md., N.J., N.Y. (2); Tex. (4).
?P. syriaca Sacc.—N.Y. (1). (*?Ascochyta abelmoschi*).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (1); Tex. (2,3,4).
Phytophthora parasitica Dast., stem rot. Tex., P.R. (3).
Puccinia schedonnardi Kell. & Swing. (O,I), rust. Conn. to Ala., Tex., and Nebr. (2,5). II and III on *Muhlenbergia, Sporobolus*, and other grasses.
Rhabdospora hibiscicola (Schw.) Starb., on stems (2).
Rhizoctonia solani Kuehn, damping-off, root rot. Ala., Fla., Okla., Tex. (1); P.R. (3); Tex. (3,4).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Mass. (1).
Sclerotium rolfsii Sacc., southern blight. Ala., Fla. (1); Tex. (3).
Septoria sp., leaf spot. N.J. (2).
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. N.J. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Widespread, including Eastern, Southern, and Pacific States (1).
Ring spot—virus (*Marmor annularium* McKinney, Nicotiana virus 12 K.M.Sm.). Ga., Va. (1).

II. Arborescent Species

(1) *Hibiscus mutabilis* L., cotton rosemallow, Condeferate-rose.

Treelike shrub, native of China, planted in the Far South.

(2) *H. rosa-sinensis* L., Chinese hibiscus.

Treelike shrub, widely cultivated in semitropical regions.

(3) *H. syriacus* L., shrub-althea, rose-of-Sharon.

Treelike shrub, cultivated in zone 5 and southward.

(4) *H. tiliaceus* L. (*Pariti tiliaceum* (L.) St. Hil.), emajagua.

Shrub or small tree of tropical regions, grown for fiber and as a hedge plant.

(5) Other species, those cultivated in T.H. and the West Indies.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Miss.
Alternaria tenuis Auct., leaf spot. Ind., N.J., Pa.
Botryosphaeria hibisci (Schw.) Sacc.—La., S.C.
B. ribis Gross. & Dug.—Ga.
B. ribis Gross. & Dug. var. *chromogena* Shear, N.E. Stevens, & M.S.Wilcox, on branches. T.H.

Camarosporium lyndonvillae Fairm., on twigs. N.Y.
Campanella cucullata (Jungh.) Lloyd—T.H.
Cephaleuros virescens Kunze, green scurf. P.R.
Cercospora hibisci Tr. & Earle, leaf spot. Ala., Okla., Tex., P.R. (2); P.R. (4).
C. hibiscina Ell. & Ev.—P.R.
C. malayensis F.L. Stevens & Solheim, leaf spot. Ga. (3); T.H. (5).
Choanephora conjuncta Couch, on fallen flowers. N.C.
C. infundibulifera Curr. Sacc., on leaves; blossom blight. Fla.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Colletotrichum hibisci Pollacci, dieback. Fla., Tex. (2).
Coniothyrium hibisci (Berk.) Tassi, on twigs. S.C.
Diaporthe sp., T.H.
D. eres Nits., on twigs. N.J., S.C.
Diplodia hibiscina Cke. & Ell., on branches. N.J.
D. theobromae (Pat.) Nowell—T.H.
Dothidea collecta (Schw.) Ell. & Ev.—Ga.
Fusarium lateritium Nees (*F. berkelei* Mont.), on twigs, ?dieback. Fla., La., N.Y.
Hendersonia collapsa Cke. & Ell.: See *Stagonospora collapsa.*
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Irenopsis coronata (F.L.Stevens) Speg., black mildew. P.R. (4).
Kuehneola malvicola (Speg.) Arth., (II,III), rust. Gulf States, P.R. (3); on *H. cardiophyllus* A.Gray, Tex.
Meloidogyne spp., root knot nematodes. Miss., Tex., T.H. (3).
Nectria cinnabarina Tode ex Fr., on branches. Mass., Ohio, Ga.; ?canker.—Ky.
N. effuscata Berk. & Curt—S.C.
Pellicularia filamentosa (Pat.) Rogers, web blight. Fla. (2).
P. koleroga Cke., thread blight. Fla., P.R.
Phomopsis hibisci Dearn., on twigs. N.Y.
P. malvacearum West.—Md.
P. ophites (Sacc.) Trav.—Pa.
Phyllachora minuta P. Henn., black leaf spot. P.R. (4).
Phyllosticta hibiscina Ell. & Ev., leaf spot. La. (1), Okla. (3).
P. syriaca Sacc.—N.Y. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Physalospora fusca N. E. Stevens, on branches. Fla., T.H.
P. obtusa (Schw.) Cke.—Fla.
Pseudomonas solancearum E.F.Sm., bacterial wilt. Fla.
P. syringae Van Hall, bacterial spot. Calif.
Puccinia heterospora Berk. & Curt.—On *H. cardiophyllus* in Tex.
Rosellinia bunodes Berk. & Br., root rot. P.R.
Sphaeropsis hibisci (Berk.) Cke. and *S. lyndonvillae* Sacc. (*?Physalospora obtusa*), on branches. N.Y., S.C.
Sphaerostilbe gracilipes Tul., on bark. S.C.
Stagonospora collapsa (Cke. & Ell.) Sacc., on twigs. Pa.
Tubercularia vulgaris Tode ex Fr.—Mo.
Xanthomonas solanacearum (E.F.Sm.) Dows.: See *Pseudomonas solanacearum.*
Xylaria sp., wilt., root disease. T.H.
Mosaic—suspected virus. Fla. (2).

Lavatera

Lavatera spp., especially *L. arborea* L., treemallow and *L. assurgentiflora* Kellogg, California treemallow.

Flowering, sometimes treelike, shrubs: the former species of European origin, the latter native in southern California; both are cultivated for ornament and hedges.

Colletotrichum malvarum (A. Braun & Casp.) Southworth, anthracnose, leaf spot. Calif., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia malvacearum Bert., (III), rust. Calif.
Rhizoctonia solani Kuehn, damping-off. On *L. arborea*, Ill.
Valsa lavatera Cke. & Harkn., on stems. Calif.
Variegation—infectious chlorosis virus (Abutilon virus 1 (Baur) K.M.Sm., *Marmor abutilon* Holmes). Variegated forms in cultivation presumably contain this virus.

Malachra

M. capitata L.

Shrub of tropical America, sometimes grown for ornament in the Far South.

Cercospora malachrae Heald & Wolf (*C. malachrae* Young), leaf spot. Tex., P.R.

Malva, mallow

(1) Garden species, such as *M. moschata* L., musk mallow, and *M. sylvestris* L., high mallow.
(2) Noncultivated species, including *M. nicaeensis* All., *M. parviflora* L., and *M. rotundifolia* L.

Mostly biennial, although some annual, herbs of Europe; some species grown in gardens and locally escaped; other species widely naturalized in the United States; wildlife-food plants.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. N.Y. (2).
Alternaria sp. (*?A tenuis* Auct.), leaf spot. Mich. (1); Ind., N.Y. (2).
Ascochyta althaeina Sacc. & Bizz., leaf spot. Md. (2).
Cercospora althaeina Sacc. (*C. malvicola* Ell. & G. Martin), leaf spot. N.J. to Miss., Tex., and Kans. (2).
C. beticola Sacc.—Natural and artificial infection in Iowa (2).
C. malvarum Sacc., leaf spot. Ind., Kans., N.J., Wis. (2).
Cladosporium sp.—Wash. (2).
Colletotrichum malvarum (A. Braun & Casp.) Southworth, leaf spot. N. Dak. (2); reported as *C. magnusianum* Bres.—Wis. (2).
Erysiphe cichoracearum DC., powdery mildew. Calif. (2), (on *M. nicaeensis*).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Puccinia heterospora Berk. & Curt. (III), rust. Kans., Tex. (on *M. sylvestris.*).
P. malvacearum Bert. (III), rust. Calif., Colo., Oreg., W. Va. (1); Calif., Colo., Va., general (2).
Rhizoctonia solani Kuehn, root rot. Wash. (2).
?Septoria destruens Desm.—Tex., N.Y. (2).
?S. heterochroa Desm.—Mich., N.Y., Wis. (2).
S. malvicola Ell. & G. Martin, leaf spot. Vt. to Tex. and N. Dak. (2).
Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1,2).
Spotted wilt—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (2).
Yellows—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (1,2).

Malvastrum, false-mallow

(1) *M. coccineum* (Pursh) A.Gray, red false-mallow.
(2) *M. fasciculatum* (Nutt.) Greene, bush-mallow.
(3) Other species.

Perennial, canescent herb of western Plains (1); or a large shrub of range 5 and 10 (2); sometimes grown for ornament.

Cercospora micranthae Muller & Chupp, leaf spot. P.R. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Puccinia heterospora Berk. & Curt. (III), rust. Tex. (3).
P. interveniens (Pk.) Bethel (O,I), rust. Calif. (2). III on *Stipa* sp.
P. malvacearum Bert. (III), rust. Reported in U.S. on (3) several times, but possibly confused with *P. heterospora;* authentically reported on tropical *Malvastrum* spp. in West Indies.
P. schedonnardi Kell. & Swingle (O,I), rust. Colo., Kans., Mont., N. Dak., Nebr., N. Mex. (1); Calif. (2). II and III on various wild grasses.
P. sherardiana Koern. (O,III), rust. Colo., Kans., Mo., Mont., N. Dak., Nebr., N. Mex., Okla., S. Dak., Tex., Utah, Wyo. (1); Calif. (2).

Malvaviscus

(1) *M. drummondii* Torr. & Gray
(2) Other species.

Trees or shrubs of tropical America, grown for ornament in the Far South; (1), bearing edible fruit, occurs in Florida and Texas.

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (on *M. arboreus* Cav.).
Kuehneola malvicola (Speg.) Arth. (II,III), rust. Tex. (1).
Phyllosticta malvavisci J. A. Stevenson, leaf spot. Tex. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Puccinia heterospora Berk. & Curt. (III), rust. Tex. (1).
Rhizoctonia crocorum (Pers. ex DC.) Fr., root rot. Tex. (1). Mycelial stage of *Helicobasidium purpureum* (Tul.) Pat.
Sclerotinia sclerotiorum (Lib.) d By., twig blight. Tex.

Montezuma

M. speciosissima Moc. & Sessé

Tree of Puerto Rico, grown for ornament.

?Glomerella cingulata (Ston.) Spauld. & Schrenk, ?leaf blight. Fla.
Phakopsora desmium (Berk. & Br.) Cumm. (II,III), rust. P.R.

Pavonia

Pavonia spp.

Shrubs or herbs of subtropical regions, grown for ornament. *P. lasiopetala* Scheele occurs in range 17,20,30; and several South American species are locally naturalized in the southern United States.

Asterina solanicola Berk. & Curt., black leaf spot. P.R. (on *P. spinifex* Cav.).
Kuehneola malvicola (Speg.) Arth. (II,III), rust. P.R. (on *P. racemosa* Sw.); Tex. (on *P. lasiopetala*).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia heterospora Berk. & Curt. (III), rust. C.Z., P.R. (on *P. racemosa*).
Pucciniosira pallidula (Speg.) P. Henn.—P.R. (on *P. paniculata* Cav.).
Uromyces pavoniae Arth.: See *Puccinia heterospora.*

Sida

(1) *S. acuta* Burm.
(2) *S. hederacea* (Dougl.) Torr.
(3) *S. rhombifolia* L.
(4) *S. spinosa* L.
(5) Species not determined or not designated.

Annual or perennial herbs or shrubs, mostly tropical or extending into the Southern and Southwestern States; a few are occasionally grown for ornament; several species are food plants for wildlife.

Asterina diplocarpa Cke. (*A. sidicola* Ryan), black mildew. P.R. (1).
Cercospora densissima Speg., leaf spot. P.R. (1).
C. sidicola Ell. & Ev., La., Tex. (4).
Colletotrichum malvarum (A. Braun & Casp.) Southworth, leaf spot. Kans., Tex., Utah (4).
Dothidea collecta (Schw.) Ell. & Ev., on stems. Ga. (3).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Irenopsis molleriana (Wint.) F. L. Stevens, black mildew. P.R.
Meloidogyne spp., root knot nematodes. Fla. (3); Ala. (4); Miss., T.H. (5).
Oidium erysiphoides Fr., powdery mildew. V.I.
Phyllosticta spinosa Ell. & Kell., leaf spot. Kans., Tex. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,3,4).
Puccinia heterospora Berk. & Curt. (III), rust. Fla. to Tex., Mo., and Ind. (4); Ariz., Calif., Tex. (on *S. hastata* St. Hil.); P.R., T.H., V.I. (5).
P. lobata Berk. & Curt. (III), rust. Ariz., Calif., N. Mex., Tex., Utah (2).
P. malvacearum Bert. (III), rust. T.H.
P. schedonnardi Kell. & Swing. (O,I), rust. N. Mex. (2).
Ramularia areola Atk. (=*Mycosphaerella areola* Ehrlich & Wolf)—Fla. (1,5).
R. sidarum Petr. & Cif. (*R. sidae* Olive), leaf spot. Fla. (1); La. (5).
Sclerotium rolfsii Sacc., southern blight. Fla. (3).
Mosaic—virus (*Marmor abutilon* Holmes, Abutilon virus 1 K.M.Sm.). Fla. (3), P.R. (1,3).

Sidalcea, checkermallow

(1) *S. candida* A.Gray
(2) *S. malvaeflora* (Moc. & Sessé) A.Gray
(3) *S. neomexicana* A.Gray
(4) *S. oregana* (Nutt.) A.Gray

Perennial herbs of the Pacific and Rocky Mountain States, all bearing showy flowers; some introduced into cultivation; also food plants for wildlife.

Endophyllum tuberculatum (Ell. & Kell.) Arth. & Fromme (III), rust. Colo. (1,2,3), Wyo. (2,3).
Leptosphaerulina sidalceae Zeller, on stems. Oreg.

[illegible] sp. (*Sphaerella sidicola* Ell. & Ev.), on leaves. Calif. (2); Utah (4).
[illegible] [illegible], on stems. N. Mex. (3).
Puccinia interveniens (Pk.) Bethel (O,I), rust. Utah (1,2,4); Calif., Mont. (2); Colo., Wyo. (3); Idaho (4); Oreg., Wash. II and III on *Stipa* spp.
P. schedonnardi Kell. & Swing. (O,I), rust. Colo. (1). II and III on *Muhlenbergia*, *Sporobolus*, etc.
P. sherardiana Koern. (O,III), rust. Calif. (2,4); Nev. (2); Colo., Oreg., Wash. (4); Ariz.
Sphaerulina sidicola Ell. & Ev., leaf spot. Colo., Wyo. (1); Colo. (3); Calif. (species not designated).
Sphaerulina [illegible] Desm. Calif. (2).

Sphaeralcea globemallow

(1) *S. ambigua* A. Gray
(2) *S. angustifolia* (Cav.) G. Don
(3) *S. fendleri* A. Gray
(4) *S. mancoana* (Dougl.) Spach
(5) *S. rivularis* (Dougl.) Torr.

Mostly perennial herbs of plains and open woodlands in the Rocky Mountain and Southwestern States; showy-flowered and sometimes grown in gardens; also wildlife-food plants.

Erysiphe polygoni DC., powdery mildew. Idaho (5).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Puccinia interveniens (Pk.) Bethel (O,I), rust. Idaho, Wash. (5).
P. schedonnardi Kell. & Swing. (O,I), rust. Ariz. (1); Tex., N. Mex. (2); N. Mex. (4).
P. sherardiana Koern. (O,III), rust. Ariz., Calif., Colo., Nev., N. Mex., Tex., Utah (on some or all species listed except (5)); Idaho, Wash. (4).
P. sphaeralceae Gäum. (I,III), rust on leaves and stems. Calif. (1).

Thespesia

Thespesia spp., especially *T. populnea* (L.) Soland., portia-tree.

Small tropical tree, sometimes grown for ornament and wood in southern Florida and the West Indies.

Lophodermium sp., on leaves. T. H.

MARANTACEAE

Calathea

Calathea spp., in part *Maranta* of florists.

Perennial herbs of tropical America, grown for ornament in greenhouses.

Glomerella cincta (Berk. & Curt.) Spauld. & Schrenk (*G. cingulata* (Ston.) Spauld. & Schrenk), leaf spot. N.J.
Phyllosticta sp., leaf spot. N.J.
Puccinia cannae (Wint.) P. Henn. (II,III), rust. C.Z., P.R. (?) and I unknown.

Maranta

(1) *M. arundinaceae* L., arrowroot.
(2) Other species.

Perennial herbs of tropical America, cultivated for starchy roots, a source of tapioca; also cultivated for ornament.

Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf spot. Md., N.J. (1,2).
Phyllosticta marantaceae P. Henn., leaf spot. T.H. (2).
Puccinia cannae (Wint.) P. Henn. (II,III), rust. Fla. (1).

Thalia

(1) *T. dealbata* Roscoe
(2) *T. geniculata* L.

Tall perennial herbs of marshes of the Gulf States (1) and of tropical America (2); food plants of wildlife.

Cercospora thaliae Ell. & Langl., leaf spot. La. (1).
Puccinia cannae (Wint.) P. Henn. (II,III), rust. Fla., P.R. (?). Rust is perhaps *T. divaricata* Chapm.

MARTYNIACEAE

Proboscidea

P. louisianica (Mill.) Thell. (*Martynia louisiana* Mill.), proboscisflower, rams-horn, devilsclaw.

Annual herb of the Gulf and Central States, sometimes cultivated for ornament or for the fruits which are used in preserves; a wildlife-food plant.

Cercospora beticola Sacc., leaf spot. Iowa, Okla., Tex., Wis., ?Kans.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pseudomonas martyniae (Elliott) Stapp, bacterial leaf spot. Kans.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Mass.
Sclerotium rolfsii Sacc., southern blight. Tex.
Mosaic—virus. In part cucumber mosaic virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.); perhaps also tobacco mosaic virus (*Marmor tabaci* Holmes, Nicotiana virus 1 K.M.Sm.). Iowa, Wis.

MELASTOMACEAE

Clidemia

Clidemia spp., especially *C. hirta* (L.) D. Don (*Cuthbertia*) and *C. strigillosa* (Sw.) DC., terrestrial.

Shrubs of tropical America.

Schizoderma marina (Cornu) Goodspeed. See *Melastoma* sp.

Meloidogyne sp., root knot nematodes.
Irene melastomacearum (Speg.) Toro, black mildew. P.R.

Melastoma

Melastoma sp.

Tropical shrubs grown under glass, or in open in warm regions, for ornament.

Asterina correicola Cke. & Mass. and *A. transiens* Th., black leaf spot. P.R.
Asterinella melastomacearum Ryan, black leaf spot. P.R.
Morenoella melastomacearum Ryan, black leaf spot. P.R.

Miconia

Miconia spp.

Shrubs or trees of tropical America, widely cultivated as ornamentals; also cultivated under glass in the United States.

Areneomyces miconiae (F. L. Stevens) Toro, on leaves. P.R.
Asterina spp., black leaf patch. P.R. Species reported include: *A. belluciae* P. Henn., *A. camelliae* Syd. & Butl., *A. carbonacea* Cke. and var. *anacardii* Ryan, *A. chrysophylli* P. Henn., *A. correicola* Cke. & Mass., *A. melastomatis* (Lév.) Arnaud, *A. spathulata* (Ryan) Seaver & Chardon, *A. theisseniae* Ryan, *A. transiens* Th.
Aulographum culmigenum Ell., black leaf spot. P.R.
Blastotrichum miconiae F. L. Stevens, leaf spot. P.R.
Cephaleuros virescens Kunze, green scurf. P.R.
Dothidina peribebuyensis (Speg.) Chardon, on leaves. C.Z., P.R.
Echidnodella miconiae Ryan, on leaves. P.R.
Hyalosphaeria miconiae F. L. Stevens, on leaves. P.R.
Irene melastomacearum (Speg.) Toro, black mildew. P.R.
Irenopsis miconiae F. L. Stevens and *I. miconiaeicola* F. L. Stevens, black mildew. P.R.
Lembosia diffusa Wint., *L. melastomatum* Mont., and *L. sclerolobii* P. Henn., on leaves. P.R.
Microclava miconiae F. L. Stevens, on leaves. P.R.
Morenoella spp., black leaf patch. P.R. Species reported include: *M. dothideoides* (Ell. & Ev.) Hoehn. and var. *impetiolaris* Ryan, *M. gigantea* Ryan, *M. miconiae* Ryan, *M. miconicola* Ryan, and *M. pothodei* var. *laevigata* Ryan.
Rosellinia bunodes (Berk. & Br.) Sacc., root rot. P.R.
Septoria miconiae Garman, leaf spot. P.R.

Rhexia, deergrass, meadowbeauty

Rhexia spp.

Perennial herbs of the Eastern and Southern States, having showy cymose flowers; cultivated for ornament.

Cercospora erythrogena Atk., leaf spot. Ala., Del., Miss., Tenn.
Colletotrichum rhexiae Ell. & Ev., leaf spot. Del.
Phyllosticta rhexiae Dearn. & House, leaf spot. Fla.

Tamonea

Tamonea spp.

Tropical American shrubs, sometimes planted for ornament.

Asterina guianensis Ryan, black mildew. P.R.
Lembosia rollineae Rehm, black mildew. P.R.
Morenoella miconiae Ryan, black mildew. P.R.

Tetrazygia

T. elaeagnoides (Sw.) DC., cenizo.

Tropical American shrub.

Asterina dilabens Speg., *A. tetrazygiae* Ryan, black leaf spot. P.R.
Dothidina peribebuyensis (Speg.) Chardon, black leaf spot. P.R.
Guignardia tetrazygiae F. L. Stevens, leaf spot. P.R.

Tibouchina

T. semidecandra Cogn., glory-bush.

Shrub of Brazil, grown in the Far South for ornament.

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.

MELIACEAE

Cedrela

(1) *C. odorata* L., West Indian cedar, Spanish-cedar.

Tree of tropical America, its fragrant wood used for furniture, cabinets, cigar boxes, and other articles.

(2) *C. sinensis* Juss., cedrela.

Ornamental tree of China, with large, feathery foliage; sometimes cultivated in New York and southern New England.

Dimerosporium urbanianum P. Henn.: SEE *Parodiopsis melioloides.*
Parodiopsis melioloides (Wint.) Maubl., on leaves. P.R. (1).
Phyllachora balansae Speg., seedling blight. P.R. (1).
Schizophyllum commune Fr., wound rot. N.Y. (2).

Melia

M. azedarach L., chinaberry, China tree.

Shade tree of southern Asia, now naturalized in tropical America and the southern States from North Carolina to Texas. Var. *umbraculiformis* Berckm. (*umbraculifera* Hort.), Texas umbrella tree, is distinguished.

Botryodiplodia meliae Ell. & Ev., on branches. La. ?Conidial stage of *Physalospora rhodina.*
Botryosphaeria ribis Gross. & Dug., on branches. Ala., Fla., Ga., S.C.
Cercospora leucosticta Ell. & Ev., leaf spot. Gulf States, P.R.
C. meliae Ell. & Ev.—Gulf States.
C. subsessilis Syd., leaf spot. Tex.
Diplodia langloisii Sacc. & Syd., on branches. La., Okla. ?Conidial stage of *Physalospora rhodina.*
?Dothidea collecta (Schw.) Ell. & Ev.—Ga.
Eutypella stellulata (Fr.) Sacc., twig blight. Okla., Tex.
Fomes meliae (Underw.) Murr., wood rot. Ala.
Fusarium lateritium Nees, on twigs. S.C., Tex.; twig blight. Tex.
F. sarcochroum (Desm.) Sacc., on berries. Ala., La.
Glomerella cingulata (Ston.) Spauld. & Schrenk, on twigs and berries. La.
Helicobasidium purpureum (Tul.) Pat. (*Rhizoctonia crocorum* Pers. ex DC.), root rot. Tex.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Macrophoma sp. and *M. subconica* Ell. & Ev., on branches. Ala., Tex.
Meloidogyne sp., root knot nematodes.
Nectria cinnabarina Tode ex Fr. (*N. meliae* Earle), on twigs. Calif., Ga., Gulf States, S.C.
N. coccinea Pers. ex Fr., canker. Miss., S.C.
Pellicularia koleroga Cke., limb blight. Fla.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Tex.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Miss.

Phyllosticta azedarachis Thuem., leaf spot. Ala.
P. meliae Ell. & Ev.—La., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Physalospora fusca N. E. Stevens, on branches. Ga.
P. obtusa (Schw.) Cke., on branches. Ala., Fla., Ga.
P. rhodina (Berk. & Curt.) Cke.—Ga.
Polyporus pavonius Hook. ex Fr., wood rot. P.R.
P. versicolor L. ex Fr.—Ga.
Pseudoperonospora portoricensis (Lamkey) Seaver & Chardon, downy mildew. P.R.
Rhizoctonia crocorum Pers. ex DC.: See *Helicobasidium purpureum.*
Schizophyllum commune Fr.—Okla.

Swietenia

S. mahagoni Jacq., mahogany.

Large evergreen tree of Florida and the West Indies, its dark, red wood of commercial value; sometimes planted for shade in southern Florida.

Pestalotia swieteniae Gonz. Frag. & Cif.—Fla.
Phyllachora swieteniae Petr. & Cif., on leaves. Fla.
Phyllosticta swieteniae Alvarez Garcia, seedling blight. P.R.

Trichilia

Trichilia spp.

Small trees of tropical America, sometimes planted for ornament.

Uredo trichiliae Arth. (II), rust. P.R.

MENISPERMACEAE

Cocculus, coralbeads

C. carolinus (L.) DC. (*Cebatha carolina* Britt.), Carolina moonseed, snailseed.

Twining shrub of range 11,17,20,25,28,29,30. *C. trilobus* (L.) DC. from East Asia also is cultivated.

Cercospora cocculicola Ray, leaf spot. Okla.
C. menispermi Ell. & Holw., leaf spot. Miss., Tex.
Echidnodella cocculi F. L. Stevens & Ryan, on leaves. T.H. (on *C. ferrandianus* Gaudich.).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke.—Ga.

Menispermum, moonseed

Menispermum spp.

Twining vines sometimes grown for ornament, zone 4. *M. canadense* L., yellow parilla, is endemic in the Eastern and Central States; *M. dauricum* DC. is a native of eastern Asia.

Cercospora menispermi Ell. & Holw., leaf spot. N.Y. to Va., Kans., and Wis.
Colletotrichum sordidum J. J. Davis, leaf spot. Wis.
Diaporthe beckhausii Nits. (*D. menispermi* Dearn. & House), on stems. N.Y.
Diplodia sarmentorum Fr., on dead stems. N.Y.
Entyloma menispermi Farl. & Trel., leaf smut. Pa. to Va., Kans., and N. Dak.
Microsphaera alni DC. ex Wint., powdery mildew. Widespread, Iowa, Mich., N.Y., Ohio.
Phomopsis menispermi (Pk.) Grove, on stems. Kans.
Phyllosticta abortiva Ell. & Kell.—Iowa.
P. menispermicola Tehon & Daniels, leaf spot. Ill.
Ramularia contexta Ell. & Ev.: See *Entyloma menispermi.*
Septoria abortiva (Ell. & Kell.) Tehon & Daniels, leaf spot. Ill., Kans., Ky.
Sphaeropsis menispermi Pk., on stems. Widespread, N.Y. to Va., Kans., and Mich. ?Conidial stage of *Physalospora obtusa.*
Valsa menispermi Ell. & Holw., on stems. Iowa.

MORACEAE

Artocarpus

Artocarpus spp., such as *A. communis* Forst., breadfruit, and *A. integra* (Thunb.) Merr., jackfruit.

Milky-juiced tropical trees with ornamental foliage and edible fruit.

Cephaleuros virescens Kunze, algal leaf spot. P.R.
Colletotrichum artocarpi Del.—T.H. (on *A. incisa* L.).
Mycosphaerella artocarpi F. L. Stevens & Young—T.H. (on *A. incisa*).
Orbilia epipora (Nyl.) Karst.—T.H. (on *A. incisa*).
Phyllosticta artocarpi Speg.—T.H. (on *A. incisa*).
Sclerotium rolfsii Sacc., seedling blight. P.R.
Uredo artocarpi Berk. & Br., rust. P.R.

Broussonetia

B. papyrifera (L.) Vent., paper-mulberry.

Tree introduced from Asia, naturalized in the United States. Range 17,20,25,27,28,29.

Cercosporella mori Pk.—N.C.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.
Nectria cinnabarina Tode ex Fr., dieback and trunk canker. Ala., N.Y.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. Ala., Md., Okla.

Cannabis

C. sativa L., hemp.

Tall annual of temperate Asia, extensively grown for fiber and sometimes for ornament or plant cover; commercial production chiefly in Kentucky, Minnesota, Iowa, Illinois, and Wisconsin; also naturalized in the Eastern and Central States; a wildlife-food plant.

Botryosphaeria marconii (Cav.) Charles & Jenkins, stem canker, wilt. Md., Va.
Botrytis cinerea Pers. ex Fr., gray mold. Oreg., Va.
Cylindrosporium sp., leaf spot. Md.
Fusarium sp., canker, stem rot. Ill., Ind., Va., Wis. Conidial stage of the following.
Gibberella saubinetii (Mont.) Sacc., stem rot. Ind., Va.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Hypomyces cancri (Rutgers) Wr., on roots, ?root rot. Md.
Macrophomina phaseoli (Maubl.) Ashby—Ill.
Meloidogyne sp., root knot nematodes. Tenn.
Orobanche ramosa L., broom rape, parasitic on roots. Calif., Ill., Ky., Wis.
Phomopsis ?cannabina Curzi, on stems. Ill.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. Mont.
Sclerotium rolfsii Sacc., southern blight. S.C., Tex.
Septoria cannabis (Lasch) Sacc., leaf spot. Md. to Ky., Iowa, and Minn.; Fla., Tex.

Cecropia

C. peltata L., trumpettree, snakewoodtree.

Large-leaved tree of tropical America, its hollow branches used for making wind instruments; *C. palmata* Willd. is cultivated in Florida.

Anthostomella cecropiae (Rehm) Hoehn., on leaves. C.Z., P.R.
Appendiculella tonkinensis (Karst. & Roum.) Toro.
Auerswaldia cecropiae P. Henn.—P.R.
Fusicladium cecropiae (F. L. Stevens) Toro, on leaves. P.R.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Irene tonkinensis var. *cecropiae* F. L. Stevens—C.Z., P.R.
Meloidogyne sp., root knot nematodes. Fla.
?Passalora cecropiae F. L. Stevens—P.R.
?Phialea cecropiae (P. Henn.) Seaver, on leaf sheaths. P.R.

Ficus

(1) *F. aurea* Nutt., Florida strangler fig.

An epiphyte, later becoming a tree; cultivated as an ornamental in southern Florida.

(2) *F. carica* L., fig.

Native tree of southwestern Asia, cultivated in the United States as a garden plant in zone 6 and southward; cultivated commercially chiefly in California, Louisiana, and Texas.

(3) *F. elastica* Roxb., India rubber tree, rubber plant.

Popular house plant, native of tropical Asia; cultivated under glass and in the open in the Far South, including the var. *variegata* Hort.

(4) Other species.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Fla. (1); Calif., Tex. (2); (3).
Alternaria sp., leaf spot. S.C. (2); Ind., Ohio, Tex. (3); fruit spot—Calif. (2).
A. tenuis Auct., fruit spot. In markets, especially on Kadota figs.
Aphelenchoides fragariae (Ritz.-Bos) Christie, leaf nematode. (4).
Armillaria mellea Vahl ex Fr., root rot. Calif. (2).
Ascochyta caricae Rab., leaf spot. Oreg. (2).
Aspergillus niger v. Tiegh. (*Sterigmatocystis ficuum* (Reich.) P. Henn.), black mold, black "smut." Calif., Tex., Wash. (2).
Botryosphaeria ficus (Cke.) Sacc.—N.C. (2).
B. ribis Gross. & Dug., dieback. Fla., Tex. (2).
Botrytis cinerea Pers. ex Fr., fruit rot. Miss. (2); canker, dieback—Calif., Wash. (2).
Capnodium sp., sooty mold. Tex. (2).
Catacauma portoricensis Chardon, black leaf spot. P.R. (4).
Cephaleuros virescens Kunze, algal spot. P.R. (4).
Cephalosporium ?acremonium Cda. (*C. fici* Tims & L. Olive), leaf spot. La. (2).
Cercospora bolleana (Thuem.) Speg.: SEE *Mycosphaerella bolleana.*
C. fici Heald & Wolf (*C. ficina* Tharp), leaf blotch. N.C. to Fla. and Tex. (2); on *Ficus repens* Hort. (=*F. pumila* L.) in S.C.
Ceratostomella hystricina (Cke.) Sacc.—S.C. (2).
Cerotelium fici (Cast.) Arth.: SEE *Physopella fici.*
Choanephora cucurbitarum (Berk. & Br.) Thaxt., fruit rot. Tex. (2).
Cladosporium herbarum Pers. ex Fr., fruit spot. In markets.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (4).
Colletotrichum gloeosporioides Penz. (*C. carica* F. L. Stevens & Hall, *S. elasticae* Tassi), anthracnose (fruit rot). Fla. (1); N.C. to Tex. (2). Conidial stage of *Glomerella cingulata.*
Corticium salmonicolor Berk. & Br., limb blight. Gulf States (2). Reported also as *C. laetum* Karst. No authentic collections of *C. laetum* in America; presence of *C. salmonicolor* very questionable.
Dematophora necatrix Hartig, root rot. ?N.C. (2).
Diplodia natalensis P. Evans, fruit rot, twig blight. Tex. (2). Conidial stage of *Physalospora rhodina.*
D. sycina Mont. var. *syconophila* Sacc., canker, dieback. N.C., Oreg., Tex. (2).
Eutypa sp., leaf spot. Tex. (2).
Eutypella fici Ell. & Ev., on dead twigs. La., Tex. (2).
Fumago vagans Fr., sooty mold. Gulf States (2).
Fusarium sp., wilt. Ala. (2); fruit rot. N.C. (2).
F. lateritium Nees, twig blight. Calif. (2). Conidial stage of *Gibberella baccata* (Wallr.) Sacc.
F. moniliforme Sheldon, fruit rot. Calif. (1).
F. moniliforme Sheldon (*F. moniliforme* var. *fici* Caldis), endosepsis (internal fruit rot). Calif. (2). Conidial stage of *Gibberella fujikuroi* (Saw.).
Glomerella cingulata (Ston.) Spauld. & Schrenk (*Colletotrichum elasticae* Tassi, *C. gloeosporioides* Penz., *Gloeosporium elasticae* (Thuem.) Cke. & Mass. (=*G. cingulata* var. *minor* Wr.), *Gloeosporium intermedium* Sacc.), anthracnose fruit rot, leaf spot. N.C. to Fla. and Tex. (2); general (3).
Hendersonula findens (Sacc.) Tassi, on bark. Ga. (4).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Kuehneola fici (Cast.) Butl.: SEE *Physopella fici.*
Leptostromella elastica Ell. & Ev., leaf spot. Northeastern States (3).
Macrophoma fici Alm. & Camara, canker (stems), dry rot of fruit. La., N.C., Tex. (2).
Megalonectria pseudotrichia (Schw.) Speg. (*Stilbum cinnabarinum* (Mont.) Sacc.), canker, twig blight. La., Tex. (2).
Meloidogyne spp., root knot nematodes. Southern States to Calif. (2); reported on (1,3). Limiting factor in fig production in the U.S.
Mycosphaerella bolleana Higgins (*Cercospora bolleana* (Thuem.) Speg.), leaf spot, rusty leaf. N.C. to Tex., T.H. (2); Ga. (3).
Nectria ?cinnabarina Tode ex Fr. (*Tuberculatia vulgaris* Tode), canker, twig blight. Tex. (2).
Oospora sp., souring of fruit. Tex. (2).
Ophiodothella fici E. A. Bessey, black leaf spot. Fla. (1).
O. floridana Chardon, black leaf spot. Fla., P.R. (4). Possibly the same as *O. fici* E. Bessey, which has priority, and the fungus reported as *Phyllachora ficuum* Niessl on *Ficus* in Florida. One reported as *Rhytisma* sp. on *F. benghalensis* L. in Fla. may also be the same.
Ormadothium fici Tims & L. Olive, leaf spot. La. (2).

Pellicularia koleroga Cke., thread blight. Fla., La., Miss. (2).
Phlyctaena ficuum P. Henn., leaf spot. Fla. (1).
Phoma atrocincta Sacc., on twigs. Fla. (3).
Phomopsis cinerescens (Sacc.) Trav., canker. Calif. (2). (=*Phoma cinerescens* Sacc. and probably *Libertella ulcerata* Massee; causes a branch and twig canker of figs in Europe).
Phyllosticta sp., leaf spot. Gulf States, Md., N.Y., T.H., West Indies (3).
P. physopellae Dearn. & Barth., leaf spot. Fla. (1).
P. roberti Boyer & Jacz., leaf spot. Fla. (1); Gulf States, Md., N.Y., T.H., West Indies (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (2).
Physalospora fusca N. E. Stevens, on branches. Ala., Fla. (2).
P. hoyae Hoehn., on branches. P.R. (4).
P. obtusa (Schw.) Cke., on branches. Ala., Fla. (2).
P. rhodina (Berk. & Curt.) Cke. (*Diplodia natalensis* P. Evans), canker, dieback. Ala., Fla., Tex. (2); Ga. (3).
Physopella fici (Cast.) Arth., (II,III), rust. Fla. (1); N.C. to Fla. and Tex., West Indies and Central America (2).
Phytophthora carica (Hara) Hori (=*P. palmivora* Butl.), fruit rot. T.H. (2).
Pratylenchus musicola (Cobb) Filip. and *P. pratensis* (De Man) Filip., in roots. Calif. (2).
Rhizoctonia sp., collar rot. Tex. (2).
R. microsclerotia Matz, web blight, leaf blight. Fla. to La. and Tex. (2).
Rhizopus nigricans Ehr., soft rot (fruit). Calif., Gulf States (2).
Saccharomyces sp., souring of fruit. Calif., N.C., Tex., Wash. (2).
Schizophyllum commune Fr., wood rot. Calif. (2).
Sclerotinia sclerotiorum (Lib.) d By., canker, limb blight. Calif., Tex. (2).
Sclerotium rolfsii Sacc., southern blight. Fla. (2).
S. rolfsii Sacc.—On *F. repens* in Fla. Basidial stage (*Pellicularia rolfsii* E. West) formed naturally on leaves.
Septobasidium sp., felt fungus. Miss. (2).
S. pseudopedicellatum Burt, felt fungus. Miss. (2).
Stemphylium elasticae Patterson, leaf spot. (3). Probably secondary and not distinguishable from *Alternaria* spp.
Stilbum cinnabarinum (Mont.) Sacc.: See *Megalonectria pseudotrichia.*
Thielaviopsis paradoxa (De Seyn.) Hoehn., on leaves. Fla. (4).
Trabutia (*Phyllachora*) *ficuum* (Niessl) Th. & Syd., black leaf spot. Fla. (3).
Trametes persoonii Mont., heart rot. T.H. (3).
Trichothecium roseum (Pers.) Lk., fruit rot. Gulf States (2).
Tubercularia spp. (*T. ailanthi* Cke., on twigs—Ala.; *T. fici* Edg.—Ga., La., Tex., Va.; and *T. vulgaris* Tode ex Fr.—Calif., Tex.). (2). Cf. *Megalonectria* and *Nectria.*

Mosaic—Ficus virus 1 K.M.Sm. Calif., Ga., Tex., ?Va. (2).

Chlorosis—manganese deficiency. Fla. (4).
Decline—causes multiple but in part physiological, such as high water table and saline soil. Calif. (2).
Little leaf—mineral deficiency, probably zinc. Calif. (2).
Quick decline—cause unknown. Calif. (2).
Sunburn (on trunk and branches)—Low-temperature injury to cambium. Calif. (2).

Humulus, hop

(1) *H. americanus* Nutt., American hop.

Twining perennial vine, perhaps a geographic race of (3), endemic in the Central and Western States.

(2) *H. japonicus* Sieb. & Zucc., Japanese hop.

An annual vine of China and Japan, grown for plant cover and locally naturalized.

(3) *H. lupulus* L., common hop.

Twining perennial vine of Europe, its fruit a membranaceous strobile, used in brewing; also grown for ornament and plant cover; commercial cultivation chiefly in California, Oregon, and Washington; also naturalized in the Northeastern and North Central States.

Aecidium sp., rust. Wash. (3).
Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Calif., Okla., Oreg., Wash. (3).
Armillaria mellea Vahl ex Fr., root rot. Oreg. (3).
Cercospora sp., leaf spot. Nebr. (3).
Ceriopsora dubyi Niessl, on stems. N. Mex. (1).
Colletotrichum sp., anthracnose: See *Glomerella cingulata.*
Cylindrosporium humuli Ell. & Ev., leaf spot. N.Y. to N.C., Iowa, and Wis. (3).
Erysiphe cichoracearum DC., powdery mildew. N.Y., Utah (3).
Fumago vagans Pers. ex Sacc., sooty mold on cones. Calif., Oreg., Wash. (3).
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, leaf spot. Ind., Kans., Md., N.Y., Oreg., Wash., Wis. (3).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif. (3).
Mycosphaerella erysiphina (Berk. & Br.) Kirch., leaf spot. Calif. (3).
Phyllosticta decidua Ell. & Kell., leaf spot. Iowa, Wis. (3).
P. humuli Sacc. & Speg., leaf spot. Iowa, Mass., Mich. (3). Var. *major* Ell. & Ev. is also reported in Iowa (3).
Pseudoperonospora humuli (Miy. & Tak.) G. W. Wils., downy mildew. Calif., N.Y., Oreg., Wash., Wis. (1,3).
Septoria humuli West., leaf spot. N.H.
S. lupulina Ell. & Kell.—Kans.
Sphaerotheca humuli (DC.) Burr., powdery mildew. General (1,2,3). Var. *fuliginea* (Schlecht.) Salm. is also reported in Minn.
Stagonospora humuli-americani Fairm.—N. Mex. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Maine, Ohio, Oreg., Wis. (3).

Mosaic—unidentified virus, perhaps Humulus virus 1 K.M.Sm.—N.Y., Oreg., Wash. Several other suspected virus diseases of hop have been reported under various names, such as chlorosis, ring spot, "sleepers," split leaf, and yellow fleck, but their virus nature and relationships have not been confirmed.

Maclura

M. pomifera (Raf.) Schneid, Osage-orange.

Native tree of range 20,22,25,27,28,29,30; widely cultivated, often for hedges; hardy in zone 5.

Botrytis cinerea Pers. ex Fr., on stems. Oreg.

Cercospora maclurae Ell. & Ev., leaf spot. Ala.
Cytospora maclurae Ell. & Barth.: See *Valsa maclurae.*
Daldinia concentrica (Bolt. ex Fr.) Ces. & de N.—N.C.
Dothidea crystallophora Berk. & Curt. (*D. tetraspora* Berk. & Br.), on twigs. Ill., N.J., N.Y., Pa.
Nectria cinnabarina Tode ex Fr., on twigs. Ind., N. Mex., N.Y.
Ovularia maclurae Ell. & Langl., cottony leaf spot. Ala., La., Tex.
Phoradendron engelmanni Trel., mistletoe. Tex.
P. flavescens (Pursh) Nutt.—Ind., Tex.
Phyllosticta maclurae Ell. & Ev., leaf spot, leaf distortion. Mo., N.J.
Phymatotrichum omnivorum (Shear) Dug., root rot. Okla., Tex.
Physalospora obtusa (Schw.) Cke., on branches. N.Y. to Ala., La., and Kans.
Physopella fici (Cast.) Arth. (II), rust. S.C. to Fla. and Tex.
Poria ferruginosa Schrad. ex Fr.
P. punctata Fr., on dead wood. Widespread.
Pythium ultimum Trow, damping-off. Nebr.
Rhizoctonia solani Kuehn, damping-off. Nebr.
Sentoria angustissima Pk., on leaves. Miss.
Sphaerella maclurae Ell. & Ev.—Mo.
Sphaeropsis maclurae Cke.: See *Physalospora obtusa.*
Sporodesmium maclurae Thuem., leaf blight. Mo., S.C., Tex.
Tryblidiella rufula Spreng. ex Sacc., on twigs. Gulf States, Kans.
Valsa maclurae Cke. & Ell. (*Eutypella maclurae* (Cke. & Ell.) Ell. & Ev.), on dead branches. N.J., Kans.
Verticillium sp., wilt. Conn.

Morus, mulberry

(1) *M. alba* L., white mulberry.

Deciduous tree of China, long cultivated for fruit and for ornament: known in several varieties, such as *multicaulis* (Perrot.) Loud., *pendula* Dipp., and *tartarica* (L.) Ser., Russian mulberry: zone 4 and 5 and naturalized in range 17.20,22.25.27.28.29.

(2) *M. rubra* L., red mulberry.

Deciduous tree. Range 16 through 30, except 26.

(3) Species not determined or not designated.

Acrospermoides subulata J. H. Miller & G. E. Thompson, on leaves. Ga. (2).
Acrospermum foliicolum Berk.—Ga. (1).
Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. (1).
Armillaria mellea Vahl ex Fr., root rot. Del., N.C., Okla. (1).
Botryosphaeria ribis Gross. & Dug., on branches. Ga., N.J. (1).
Cercospora missouriensis Wint.—Tex. (3).
C. moricola Cke., leaf spot. Pa. to Fla., Tex., and Nebr. (1); Ohio to Gulf States, Okla., and Kans. (2).
C. pulvinulata Sacc. & Wint.—Kans., Mo., Nebr., Tex. (2).
Cercosporella arachnoidea Wolf: See *Mycosphaerella arachnoidea.*
Cercosporella mori Pk., leaf spot. Nebr., Okla., Tex. (1).
C. maculans (Bereng.) Wolf: See *Mycosphaerella mori.*
Ciboria carunculoides (Siegler & Jenkins) Whetzel, "popcorn" (berry-hardening) disease. N.C. to Fla. and Tex. (1).
Cytospora sp., twig canker. N.J., Okla., Tex. (1).
Dendrophoma longipes (Berk. & Curt.) Grove, on branches. Kans., Mass., N.Y. (1); S.C. (2).
Dermatea mori Pk., on dead branches. Kans. (1).
Diatrypella quercina Pers. ex Fr.—Ga. (2).
Dothiorella sp. and *D. mori* Berl., canker, twig blight. N.J., Tex. (1). ?Conidial stage of *Botryosphaeria ribis.*
Exosporium sp., leaf spot. Fla. (2).
Fomes applanatus (Pers. ex Fr.) Gill., heart rot. (2).
Fusarium lateritium Nees var. *mori* Desm., canker, twig blight. Widespread (1). Conidial stage of *Gibberella baccata* (Wallr.) Sacc. var. *moricola* (de N.) Wr.
Gibberella baccata (Wallr.) Sacc.—Ga. (1), Iowa (on *Morus* spp.).
Helicobasidium purpureum (Tul.) Pat. (*Rhizoctonia crocorum* Pers. ex DC.), root rot. Tex. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Hymenochaete agglutinans Ell., heart rot. Md. (2).
Hysterographium mori (Schw.) Rehm—Ga. (2).
Massaria epileuca Berk. & Curt., on branches. Ind., N.J., Pa. (1); Ala. (2).
M. olivacea Cke.—Md., Pa. (1); Miss. (2).
Meloidogyne spp., root knot nematodes. N.C., N.J., Okla. (1); found on (2).
Mycosphaerella arachnoidea Wolf, false mildew. Ga., N.C. (2).
M. mori (Fckl.) Lindau, leaf spot. Widespread. Ga. Iowa, Tex. (1); Pa. to Fla., Tex., Wis., and W. Va. (2). The conidial stage has been variously designated as *Cercosporella maculans* (Bereng.) Wolf, *Cylindrosporium mori* Berl., *Phleospora maculans* (Bereng.) Allesch., *P. mori* (Lév.) Sacc., *Septogloeum mori* (Lév.) Briosi & Cav., and *Septoria mori* Lév. This combination by Lindau (1908) antedates that by Wolf (1935).
Myxosporium diedickei Syd., twig blight. Tex., Wash. (1).
Nectria sp. (*?N. coccinea* Pers. ex Fr.), canker. Widespread (1).
N. cinnabarina Tode ex Fr., ?canker, ?twig blight. Widespread (1), N.Y. (2).
N. verrucosa (Schw.) Sacc., on branches. N.J., Pa., S.C. (1).
Phleospora maculans (Bereng.) Allesch. and *P. mori* (Lév.) Sacc.: See *Mycosphaerelia mori.*
P. moricola (Pass.) Sacc., leaf spot. Ind., Md., S.C. (2). (Cf. *Mycosphaerella mori*).
Phoma longipes Berk. & Curt. (*P. moricola* Sacc.): See *Dendrophoma longipes.*
P. moricola Sacc.—Wis. (2).
Phyllactinia corylea Pers. ex Karst., powdery mildew. Ohio (2).
Phyllosticta moricola Ell. & Ev., leaf spot. Kans., S.C. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Okla., Tex. (1).
Physalospora obtusa (Schw.) Cke., on branches. Eastern States (1).
Physopella fici (Cast.) Arth. (II), rust. La. (2).
Polyporus farlowii Lloyd, heart rot. Ariz., Calif., N. Mex. (1).
P. gilvus (Schw.) Fr., wood rot. Ala. (2).
P. hispidus Bull. ex Fr., heart rot. Conn. (1).
Pseudomonas mori (Boyer & Lambert) Stevens, bacterial spot, blight. General, including Pacific coast, and the West Indies (1); Tex. (2).
Rhizoctonia crocorum Pers. ex DC.: See *Helicobasidium purpureum.*
Rosellinia aquila (Fr.) de N., on dead branches. Ind.; root rot. West Indies (1).
Schizophyllum commune Fr., wood rot. Calif. (1).
Sclerotinia sp. (*?S. sclerotiorum* (Lib.) d By.), canker. Tex. (1).
Septoria mori Lév.: See *Mycosphaerella mori.*

Sphaeropsis sp. and *S. sepulta* Ell. & Ev., on branches. Conn., Kans., N.Y. (1). ?Conidial stage of *Physalospora obtusa.*

Stereum cinerascens (Schw.) Mass., wood rot. (1).

Tryblidiella nigrocinnabarina (Schw.) Rehm and *T. rufula* Spreng. var. *microspora* Ell. & Ev., on branches. Ala. (1).

Uncinula geniculata Gerard, powdery mildew. N.Y. to Ga., Ala., and Kans. (2).

Valsa morigena Berk. & Curt.—Ga. (1).

Valsaria insitiva Ces. & De N., on branches. Md. (1).

LEAF MOTTLING—virus. P.R. (1).

MUSACEAE

Heliconia

(1) *H. bihai* L., wildplantain, balisier.
(2) Other species.

Robust perennial herbs of tropical America, grown for ornamental foliage, the juvenile forms in glasshouses.

Meliola heliconiae F. L. Stevens and *M. musae* (G. Kunze) Mont., black mildew. C.Z. (2).

Metasphaeria sp. (*?heliconiae* Gonz. Frag. & Cif.), leaf spot. C.Z.

Puccinia heliconiae (Diet.) Arth. (II,III), rust. C.Z. (1,2), P.R. (2).

Musa

(1) *M. nana* Lour. (*M. cavendishii* Lamb.), dwarf banana.

Treelike herb, native of China, grown for fruit and ornament especially in subtropical regions, including southern United States where the common banana is not hardy.

(2) *M. paradisiaca* L., plantain cooking banana, and subsp. *sapientum* (L.) Kuntze, common banana.

Treelike plant, native of India, now distributed throughout the tropics; cultivated extensively in Central America and several of the West Indies Islands and occasionally in southern Florida to southern California; the sweet fruit of the common banana familiar to all.

Cercospora musae Zimm.: SEE *Mycosphaerella musicola.*

C. musarum Ashby: SEE *Helminthosporium torulosum.*

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (2).

Cordana musae (Zimm.) Hoehn. (*Scolecotrichum musae* Zimm.), leaf spot. P.R. (2).

Diplodia theobromae (Pat.) Nowell, fruit rot, stem rot. Cosmopolitan in Tropics, occasionally on market fruit (2).

Fusarium cubense (E.F.Sm.) Wr.: SEE *F. oxysporum* var. *cubense.*

F. lateritium Nees, and *F. moniliforme* Sheldon var. *subglutinans* Wr., end rot of fruit, sometimes heart rot of leaves or stem. Occasional (2).

F. oxysporum Schlecht. var. *cubense* (E.F.Sm.) Wr., wilt. Fla., T.H. (1); general in Central America and the West Indies, Panama (2); (2) is usually reported as resistant.

F. vasinfectum Atk.—T.H. (2).

Glocosporium musarum Cke. & Mass., spot or rot, black end (in part), usually of ripe but somtimes of green fruit; also leaf spot and stem rot, usually secondary; common on market fruit. Fla., Tex., T.H. (1). General (2). Ascosporic strains belong to the following.

Glomerella cingulata (Ston.) Spauld. & Schrenk, on fruit, leaves, and stems. Occasional (2).

Guignardia musae F. L. Stevens—T.H. (2).

Helminthosporium torulosum (Syd.) Ashby, black-tip of fruit, black spot of leaves. P.R. (1), general (2).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Macrophoma musae (Cke.) Berl. & Vogl., freckle, black spot of fruit and leaves. T.H. (1); T.H., West Indies (2). There are numerous synonyms, such as *Dothidea musae* Klotzsch, *Phoma musae* (Cke.) Sacc., *Phyllachora musae* (Klotzsch) Sacc., and *Sphaeropsis musarum* Cke.

Marasmius sp.—Fla. (2).

M. semiustus Berk. & Curt. (*M. stenophyllus* Mont.), stem and root rot. T.H., West Indies (2).

Meloidogyne spp., root knot nematodes. Fla., Tex., T.H. (1); Tex. (2).

Mycena citricolor (Berk. & Curt.) Sacc., on leaves. P.R. (2).

Mycosphaerella musae (Speg.) Syd., on leaves. P.R. (2).

M. musicola Leach (*Cercospora musae* Zimm.), Sigatoka disease, leaf spot, heart-leaf rot. West Indies, Central America, Panama (2).

Nematosporangium spp.: SEE *Pythium* spp.

Pestalotia sp.—T.H. (2).

P. leprogena Speg., leaf spot. P.R. (2).

Phyllosticta musae F. L. Stevens & Young—T.H. (2).

P. musicola F. L. Stevens & Young—T.H. (2).

Pratylenchus musicola (Cobb) Filip., in roots. Fla. (1); West Indies (2).

Pseudomonas solanacearum E.F.Sm., leaf blight. Fla. (1); bacterial wilt, "Moko" disease. T.H., West Indies (2).

Pythium spp., rootlet rot, stem rot. T.H., West Indies (2). The following species have been reported in T.H. under the generic name *Nematosporangium; N. arrhenomanes* var. *hawaiensis* Sideris, *N. hyphalosticton* Sideris, *N. polyandron* Sideris, *N. rhizophthoron* Sideris.

Radopholus similis (Cobb) Thorne, in roots. Jamaica (2).

Rhizoctonia ?microsclerotia Matz, web blight. P.R. (2).

Sclerotium rolfsii Sacc., leaf and stem rot. P.R. (2).

Scolecotrichum musae Zimm.: SEE *Cordana musae.*

Stachylidium theobromae Turc., "cigar-end," or dry tip rot of fruit. C.Z. (1), P.R. (2).

Thielaviopsis paradoxa (De Seyn.) Hoehn., blackhead (basal stem rot), stalk rot. General in Tropics (2). Conidial stage of *Endoconidiophora paradoxa* (Dade) Davidson.

Xanthomonas solanacearum (E.F.Sm.) Dows.: SEE *Pseudomonas solanacearum.*

MOSAIC—Cucumis virus 1 (Doolittle) K. M. Smith (*Marmor cucumeris* Holmes var. *commelinae* Holmes). Fla., ?T.H. (2). (Musa virus 3 (Magee) K. M. Smith is probably a synonym).

MOSAIC—undetermined virus. T.H. (1).

MYRICACEAE

Comptonia

C. peregrina (L.) Coult., including var. *asplenifolia* (L.) Fern. (*Myrica asplenifolia* L.), sweetfern.

Low, pubescent shrub, with fragrant foliage, fruit, and twigs. Range 22,23,24,25,26,27,28.

Cronartium comptoniae Arth. (II,III), blister rust. Maine to Minn., N.C. and Ohio. O and I (*Peridermium comptoniae* Orton & Adams) forming stem galls on pitch or hard pines.
Cryptodiaporthe aubertii (West.) Wehm. var. *comptoniae* (Schw.) Wehm., on stems. Mass., N.J., N.Y.
Cucurbitaria comptoniae Cke. & Ell., on stems. N.J., N.Y.
Gymnosporangium ellisii (Berk.) Farl. (*G. myricatum* Fromme) (O,I), rust. N.J. III on *Chamaecyparis thyoides* (L.) B.S.P.
Neobarclaya flagellifera (Ell. & Ev.) Sacc. (*Pestalotia flagellifera* Ell. & Ev.), on stems. Conidial stage of *Cryptodiaporthe aubertii* var. *comptoniae*.
Ovularia destructiva (Phill. & Plowr.) Mass.—Wis.
Rhizobium sp., root nodules (symbiotic).
Thyridaria comptoniae (Ell. & Ev.) Berl. & Vogl., on stems. N.J.

Myrica

(1) *M. californica* Cham., Pacific waxmyrtle.

Evergreen shrub or small slender tree. Range 1 and 5.

(2) *M. carolinensis* Mill., bayberry.

Semi-evergreen handsome shrub. Range 20, 24,26,27,28,29,30.

(3) *M. cerifera* L., waxmyrtle, candleberry.

Evergreen shrub or small slender tree. Range 20,24,28,29,30,31,32.

(4) *M. gale* L., sweetgale, "meadowfern."

Deciduous shrub. Range 1,2,4,21,23,24,26.27.

Apioporthe phomaspora (Cke. & Ell.) Wehm., on twigs. N.J., N.Y. (2); Ga., N.J. (3); N.Y. (4).
Asterella myricae Miles, on leaves. Miss. (2).
Botryosphaeria graphidea (Berk. & Rav.) Sacc.—N.Y. (2).
B. ribis Gross. & Dug., and var. *chromogena* Shear, N. E. Stevens, and M. S. Wilcox, on roots and branches. Ala., Fla. (3).
Calonectria erubescens (Rob.) Sacc., on leaves with *Meliola*. Fla. (3).
Capnodium grandisporum Ell. & G. Martin, sooty mold. Fla. (3).
Cercospora dispersa Ell. & Ev., leaf spot. N.J. (3).
C. myricae Tracy & Earle—Miss., Tex. (3).
C. penicillus Ell. & Ev.—Miss., N.J. (3).
Ciboria acerina Whet. & Buchw., on catkins. N.Y. (4).
Clitocybe tabescens (Scop. ex Fr.) Bull., root rot. Fla. (3).
Cronartium comptoniae Arth. (II,III), rust. Oreg. (1); Maine to N.Y., Wash., and Alaska (4). O and I on *Pinus* spp.
Cuscuta compacta Juss., dodder. Fla. (3).
Diplodia sp., twig blight. N.J. (4).
Gnomonia myricae Cke. & Ell., on leaves. Ga. (2); Miss., N.J. (3).
Gymnosporangium ellisii (Berk.) Farl. (*Aecidium myricatum* Schw.) (O,I), rust. Mass. to N.Y. and Va. (2); Mass. to Md. (3); Maine (4). III on *Chamaecyparis thyoides* (L.) B.S.P.
Haplosporella lathami Dearn., on dead twigs. N.Y. (2).
Irene (*Appendiculella*) *calostroma* (Desm.) Hoehn., black mildew. Gulf States, P.R. (3).
Irenina manca (Ell. & Ev.) F. F. Stevens, black mildew. Miss. (3).
Karschia stygia (Berk. & Curt.) Mass.—Ga. (2).
Leptosphaeria sp.—Ga. (2); also on species not designated.
L. myricae Dearn. & House, on twigs. N.Y. (4).
Lophodermium hysterioides (Pers. ex Fr.) Sacc., on leaves. Calif. (1).
Meliola manca Ell. & G. Martin—Fla. (3).
Metasphaeria myricae Pk., on dead twigs. N.Y. (4).
Mycosphaerella myricae Miles, leaf spot. Ga., Miss. (2).
M. pardalota Cke. & Ell., on leaves. N.J. (3).
Nectria erubescens Desm., on leaves. Fla. (3).
Ovularia destructiva (Phill. & Plowr.) Mass., on twigs. New England, Wis., Alaska (4).
?O. monilioides Ell. & G. Martin—Maine, Mass. (4).
Pestalotia myricae Ell. & G. Martin, on leaves. Fla. (3).
Phyllosticta myricae Cke., leaf spot. Calif. (1); N.Y. (2); N.J. to Fla., Tex. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Physalospora obtusa (Schw.) Cke., on branches. Fla., Ga. (3).
Poria pulchella (Schw.) Cke. (*P. alabamae* (Berk. & Cke.) Sacc.), on dead wood. Fla. (3).
Ptychogaster cubensis Pat., wound rot. Fla. (3).
Ramularia monilioides Ell. & G. Martin, leaf spot. N.Y. (4).
Rhizoctonia solani Kuehn, seedling blight. N.J. (3).
Septobasidium spp. (*S. curtisii* (Berk. & Desm.) Boed. & Stein., *S. pseudopedicellatum* Burt, and *S. sinuosum* Couch), on scale insects infesting branches. Southeastern States (3).
Septoria myricae Ell. & Ev., leaf spot. N.J. (3).
S. myricata Dearn. & House, leaf spot. N.Y. (4).
Stagonospora myricae Ell. & Ev., on leaves. N.J. (3).

MYRISTICACEAE

Myristica

M. fragrans Houtt., nutmeg.

Cultivated and naturalized tree of the West Indies, especially in Grenada; the seed furnishing the nutmeg of commerce; the surrounding aril, the mace of commerce.

Phyllosticta sp., leaf spot. West Indies.
Rosellinia bunodes (Berk. & Br.) Sacc.—West Indies.
STEM CANKER—cause not determined.

MYRSINACEAE

Ardisia

(1) *A. crispa* (Lam.) A. DC., ardisia.
(2) *A. escallonioides* Schlecht. & Cham.
(3) *A. guadelupensis* Duchass.

Berry-bearing trees or shrubs, cultivated as ornamentals in the Far South, either as pot plants or outdoors.

Cephaleuros virescens Kunze, algal leaf spot. Fla. (1).
Hysterostomella floridana Tracy & Earle. Fla. (2).
Meliola myrsinacearum F. L. Stevens, black mildew. P.R. (3).

Myrsine

Myrsine spp.

Shrubs or trees of southern Asia, sometimes grown for ornament in Hawaii and southern United States.

Hendersonia nitida Ell. & Ev., on leaves. T.H.

Stomiopatella suttoniae Mendoza, black leaf spot. T.H.

MYRTACEAE

Eucalyptus, gum

(1) *E. globulus* Labill., blue gum.
(2) Other species cultivated in California—
E. botryoides Sm., bangalay.
E. corynocalyx F.Muell., sugar gum.
E. ficifolia F.Muell., scarlet gum.
E. leucoxylon F.Muell., ironbark.
E. maculata Hook., spotted gum, and its var. *citriodora* Hook., lemon gum.
E. resinifera Sm., mahogany gum.
E. rudis Endl., desert gum.
E. viminalis Labill., manna gum.

Evergreen trees or shrubs, mostly native in Australia, of which numerous species have been introduced since 1860 into North America, chiefly in California, Mexico, Central America, the West Indies, and in the Hawaiian Islands; grown in the United States for their ornamental value, also as windbreaks and in street planting, for fuel, and for timber. The principal species cultivated in California is (1). All the following records are for California unless otherwise stated.

?Actinopelte dryina (Sacc.) Hoehn., leaf spot. La. (1).
Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. (2).
Armillaria mellea Vahl ex Fr.—(2).
Bagnisiopsis eucalypti Dearn. & Barth., on twigs. (2).
Botryosphaeria ribis Gross. & Dug. (also var. *chromogena* Shear, N. E. Stevens, & M. S. Wilcox). canker on branches and trunks. Calif. (2), Fla., T.H.
Botrytis cinerea Pers. ex Fr., and *B. fusca* (Cke. & Harkn.) Sacc., on twigs. (2).
Ceratostomella echinella Ell. & Ev.—(2).
Clitocybe tabescens (Scop. ex Fr.) Bres., mushroom root rot. Fla. (2).
Coremium glaucum Lk., on leaves. (2).
Corticium ephiphyllum Pers. ex Cke., on leaves. (2).
Cryptosporium eucalypti Cke. & Harkn., on branches. (1).
C. eucalypti Cke. & Harkn. (*C. ceuthosporioides* Cke. & Harkn.), on branches. SEE *Septoria ceuthosporioides.*
Diaporthe medusaea Nits. (*D. eucalypti* Harkn.), on twigs and ?leaves. (1).
Dermatea eucalypti Cke. & Harkn.: SEE *Scleroderris eucalypti.*
Didymosphaeria circinnans Harkn., on leaves. (1).
D. epidermidis Fr., on branches. (2).
Diplodia australiae Speg., on bark. (1).
D. eucalypti Cke. & Harkn., on branches. (2).
D. microspora Sacc., on leaves. (2).
D. tenuis Cke. & Harkn., on branches. (2).
Fomes applanatus (Pers. ex Fr.) Gill., heart rot. Calif., T.H. (1).
F. robustus Karst., on trunks. (2).
Fusarium oxysporum Schlecht. var. *aurantiacum* (Lk.) Wr., seedling blight. (1) and on *E. robusta* Smith and *E. rostrata* Schlecht. (=*E. camaldulensis* Dehnhardt).
Gloeosporium capsularum Cke. & Harkn., on fruits. (2).
Harknessia uromycoides (Speg.) Cke., on leaves and twigs. (1).
Hendersonia coryneoidea Cke. & Harkn., on branches. (2).
H. eucalypti Cke. & Harkn., on leaves. (2).
H. eucalypticola A. R. Davis, on leaves. (1,2).
Heterosporium eucalypti Ell. & Ev., on leaves. (2).
Hypocrea consimilis Ell., on twigs. (2).
Hypoderma eucalypti Cke. & Harkn., on leaves. (2).
Macrophoma molleriana (Thuem.) Berl. & Vogl., on leaves. (1).
Melanconium globosum Cke. & Harkn., on branches. (2).
Monochaetia desmazierii Sacc., on leaves. (1).
Mycosphaerella molleriana (Thuem.) Lindau, leaf spot. (1).
Nectria eucalypti (Cke. & Harkn.) Berl. & Vogl., on branches. (2).
Pestalotia inquinans Cke. & Harkn. (*P. monochaeta* Desm.), on leaves. SEE *Monochaetia desmazierii.*
Pestalotia truncata Lév., on leaves. (1).
Pezizella carneo-rosea Sacc., on twigs. (1).
P. oenotherae (Cke. & Ell.) Sacc., on leaves (conidial and pycnidial stages). (1).
Phragmodothidea eucalypti Dearn. & Barth., on bark of dead stems. (2).
Phyllosticta extensa Sacc. & Syd. (*P. eucalypti* Ell. & Ev.), leaf spot. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (on *E. longirostis* F. Muell.).
Physalospora latitans Sacc., on leaves and twigs. Calif., Fla. (1); (2).
P. rhodina (Berk. & Curt.) Cke., on branches. Ga. (1).
P. suberumpens Ell. & Ev., on bark. (1).
Polyporus gilvus (Schw.) Fr., *P. hirsutus* Wulf. ex Fr., and *P. versicolor* L. ex Fr., wood rot. (1). *P. vellereus* Berk.—T.H. (1).
P. schweinitzii Fr. and *P. sulphureus* Bull. ex Fr., heart rot, butt rot, root rot. (1).
Poria cocos (Schw. ex Fr.) Wolf—Fla. (1).
P. versipora (Pers.) Rom.—(1).
Scleroderris eucalypti (Cke. & Harkn.) Sacc., on branches. (2).
Septobasidium curtisii (Berk. & Desm.) Boed. & Stein, felt fungus. N.C. (2).
Septonema multiplex Berk. & Curt., on trunks. (1).
Septoria ceuthosporioides (Cke.) Sacc. and *S. mortolensis* Penz. & Sacc., on leaves. (2).
Septosporium scyphophorum Cke. & Harkn., on leaves. (1,2).
Sphaeronema eucalypti Cke. & Harkn., on branches. (2).
Sphaeropsis macrospermum Cke. & Harkn. and *P. stictoides* Earle, on leaves. (2).
Stereum hirsutum Willd. ex Fr., wood rot. (1).
Stomiopeltis sp., on ?leaves. La. (2).
Valsa eucalypti Cke. & Harkn., on twigs. (1).
Valsaria eucalypti (Kalchbr. & Cke.) Sacc., on twigs. (2).
Volutella coronata Cke. & Harkn., on twigs. (2).

CHLOROSIS—iron deficiency, on calcareous soils. (2).
CROWN KNOT—stem galls on seedlings, presumed nonparasitic. (2).
INTUMESCENCE ON LEAVES—cause unknown but apparently nonparasitic. Mich. (2).

Eugenia

Eugenia spp., especially *E. australis* Wendl., Australian brush-cherry; *E. caryophyllata* Thunb., clovetree; *E. cumini* (L.) Druce (*E. jambolana* Lam.); and *E. jambos* L., Malabar-plum, rose-apple.

Tropical and subtropical evergreen trees native as far north as southern Florida, cultivated there and in southern California as ornamentals and for edible fruits.

Asteridium eugeniae Mont., black leaf spot. P.R.
Asterina colliculosa Speg. and *A. myrciae* Ryan, black leaf spot. P.R.
Asterinella cylindrotheca (Speg.) Th., black leaf spot. P.R.
A. puiggarii (Speg.) Th.—Fla.
Botryosphaeria ribis Gross. & Dug. var. *chromogena* Shear, N. E. Stevens, & M. S. Wilcox, on branches.
Cephaleuros virescens Kunze, algal spot. P.R.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Colletotrichum gloeosporioides Penz., on leaves. Md.
Dictyochorina portoricensis Chardon, black leaf spot. P.R.
Meliola hawaiiensis F. L. Stevens, black mildew. T.H.
M. helleri Earle—P.R.
Melophia eugeniae Ferd. & Winge, on leaves. V.I.
Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot. N.Y.
Phyllachora eugeniae Chardon, *P. semi-lunata* (Chardon) Petr., *P. verrucosa* Chardon, and *P. whetzelii* Chardon, black leaf spot. P.R.
P. biareolata Speg.—V.I.
Phyllosticta eugeniae Young, leaf spot. P.R.
Puccinia psidii Wint. (II,III), rust. P.R.
Rosellinia bunodes Berk. & Br., root rot. P.R.

Feijoa

F. sellowiana Berg

An ornamental and fruit-bearing shrub of South America, cultivated in California and Florida.

Botrytis cinerea Pers. ex Fr., fruit rot. Calif.
Colletotrichum gloeosporioides Penz., fruit rot. Calif.
Penicillium expansum Lk. ex Thom, fruit rot. Calif.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Rhizoctonia ramicola D. A. Roberts, thread blight. Fla.

Metrosideros, bottlebrush

Metrosideros spp.

Shrubs or trees of Australia and South Pacific Islands, with red or white long-stamened flowers; grown for ornament.

Amazonia ohianus F. L. Stevens, black mildew. T.H.
Asterina rickii Th., black leaf patch. T.H.
Meliolina haplochaeta Syd. and *M. sydowiana* F. L. Stevens, black mildew. T.H.
Metasphaeria hawaiiensis F. L. Stevens & Young, leaf spot. T.H.
Mycosphaerella metrosideri F. L. Stevens & Young, leaf spot. T.H.
Polyporus arcularius Batsch ex Fr., wood rot. T.H.
Trametes malicola Berk. & Curt.—T.H.

Myrcia

Myrcia spp.

Trees or shrubs of tropical America; some of timber value, others grown for fruit and ornament.

Asterina myrciae Ryan, black leaf spot. P.R.
Catacauma myrciae (Lév.) Th. & Syd., black leaf spot. P.R., V.I.
Cephaleuros virescens Kunze, green scurf. P.R.
Echidnodella myrciae Ryan, black leaf spot. P.R.
Meliola helleri Earle, black mildew. P.R.
Phyllachora myrciae (Lév.) Sacc., black leaf spot. P.R.
Triposporium stelligerum Speg., on leaves. P.R.

Myrtus

M. communis L., myrtle.

Evergreen shrub of Mediterranean region, cultivated since antiquity for ornament and perfume; grown in southern United States as a hedge plant.

Pestalotia decolorata Speg., leaf spot. La.
Sclerotium rolfsii Sacc., stem rot. Fla.

Pimenta

(1) *P. dioica* (L.) Merr., allspice, pimento.
(2) *P. racemosa* (Mill.) J.W.Moore, bayrum-tree.

Small trees of tropical America: (1) cultivated for the fruit which is used as a condiment; bay oil or oil of myrica distilled from the dried leaves of (2).

Meliola amomicola F.L. Stevens, black mildew. P.R. (2).
Puccinia psidii Wint. (II,III), rust. On (1). Known only in Jamaica, British West Indies, but mentioned here because of its economic interest and the occurrence of a different biological form of this rust on *Eugenia jambos* L. and *Psidium guajava* L. in P.R.

Psidium

P. guajava L., common guava.

Shrub or small tree of tropical America, widely cultivated for fruit in warm regions, naturalized in Hawaii; rich source of vitamin C. Several other species are cultivated, especially *P. cattleianum* Sabine, strawberry guava, in Florida and southern California.

Alternaria citri Ell. & Pierce, fruit decay. Calif.
Asterina psidii Ryan, black patch. P.R.
Botryosphaeria ribis var. *chromogena* Shear, N.E. Stevens, & M.S.Wilcox, on branches. Fla., T.H.
Caudella psidii Ryan, black patch. P.R.
Cephaleuros virescens Kunze, green scurf, algal spot. Fla., P.R.
Cercospora psidii Rangel, leaf spot. Fla.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Colletotrichum gloeosporioides Penz., anthracnose. Conidial stage of *Glomerella cingulata*.
Glomerella cingulata (Ston.) Spauld. & Schrenk (*G. psidii* (Del.) Sheldon), anthracnose, leaf and fruit spot, ripe rot. Fla., Tex., P.R., T.H.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meliola psidii Fr., black mildew. C.Z., P.R.
Meloidogyne sp., root knot nematodes. Fla.

Pellicularia koleroga Cke., thread blight. Fla.

Phymatotrichum omnivorum (Shear) Dug., root rot.

Polyporus versicolor L. ex Fr., wound rot. Calif.

Puccinia psidii Wint. (II), rust. P.R.

Trametes corrugata Pers. ex Bres., wood rot. T.H.

Trichomerium portoricense Speg., on leaves. P.R.

Syncarpia

S. glomulifera (J.E.Sm.) Niedenzu, turpentine-tree.

Evergreen tree of Australia, grown in the Far South for ornament; wood durable.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Fla.

NYCTAGINACEAE

Abronia, sandverbena

Abronia spp.

Annual or perennial herbs of sandy plains in the Western and Southwestern States; some are useful to wildlife.

Heterosporium abroniae Harkn., leaf spot. Calif., Tex.
Peronospora oxybaphi Ell. & Kell., downy mildew. Tex.
Puccinia aristidae Tracy (O,I), rust. Ariz., Calif., Colo., N.Mex. II and III on *Aristida* and *Distichlis* spp.

Allionia

(1) *A. incarnata* L., trailing four-o'clock.
(2) Other species.

Mostly perennial herbs of plains and prairies, (1) in the Southwest; sometimes grown in wild gardens.

Albugo platensis (Speg.) Swing., white-rust. Ariz., N.Mex., Tenn., Tex. (1).
Cercospora oxybaphi Ell. & Halst., leaf spot. Iowa, Kans., Wis. (2).
Heterosporium oxybaphi Patterson, on stems. Nebr., Tex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Puccinia aristidae Tracy (O,I), rust. Ariz., N.Mex., Tex. (2).

Boerhaavia, spiderling, wineflower

(1) *B. coccinea* Mill.
(2) *B. erecta* L.
(3) Other species.

Several annual or perennial herbs, also weeds (1,2), of arid plains and waste ground in the Gulf and Southwestern States and tropical America; some species (3) are useful to wildlife.

Albugo platensis (Speg.) Swing., white-rust. C.Z., T.H. (1); Tex., P.R., V.I. (2); Ariz., Fla., N.Mex., Tex., P.R. (3).
Ascochyta boerhaaviae Tharp, leaf spot. Tex. (2).
Cercospora boerhaaviae Tharp, leaf spot. Tex. (3).
C. furfurella Speg.—Tex. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. ?Fla. (1,3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,3).
Xanthomonas campestris (Pam.) Dows., bacterial spot. Tex. (2).

Bougainvillea

Bougainvillea spp.

Porch or arbor vines of warm countries, with small flowers usually enclosed by large purple, red, orange, and white bracts: *B. glabra* Choisy, paperflower, and *B. spectabilis* Willd. cultivated in the southern United States.

Cladosporium arthrinioides Thuem. & Beltr., on leaves. Tex.

MOSAIC—undetermined virus. Fla.

Mirabilis

(1) *M. jalapa* L., common four-o'clock.
(2) *M. multiflora* (Torr.) A.Gray, Colorado four-o'clock.

Perennial herbs of tropical America (1) and of the Southwestern States (2); (1) long cultivated in gardens and locally naturalized, (2) also of ornamental value.

Aecidium mirabilis Diet. & Holw. (O,I), rust. Ariz., N.Mex. (2).
Albugo platensis (Speg.) Swing., white-rust. Tex. (1).
Cercospora mirabilis Tharp., leaf spot. Tex. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp .
Meloidogyne sp., root knot nematodes. ?Fla. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Puccinia aristidae Tracy (O,I), rust. Ariz. (2).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1).

Oxybaphus

O. nyctagineus (Michx.) Sweet, umbrellawort.

Perennial herb of plains and prairies in the Central and Western States; sometimes grown in wild gardens.

Albugo platensis (Speg.) Swing., white-rust. Ala.
Ascochyta oxybaphi Trel., leaf spot. Iowa, Wis.
Cercospora oxybaphi Ell. & Halst., leaf spot. Ill., Iowa, Kans., Nebr., Ohio, Tex.
Peronospora oxybaphi Ell. & Kell., downy mildew. Kans., S.Dak.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

NYMPHAEACEAE

Nelumbo

(1) *N. lutea* (Willd.) Pers., American lotus, water chinkapin.
(2) *N. nucifera* Gaertn., Hindu lotus.

Perennial aquatic herbs of striking beauty: (1) native throughout the Eastern, Central, and Gulf States; important food plants of wild-

life (2) of southern Asia and ancient cultivation, grown in water gardens and locally escaped; important food plants of wildlife.

Alternaria nelumbii Enlows & Rand, leaf spot. Okla., ?Tex. (1); Md., N.J., N.Y., Pa. (2).
Cercospora nelumbonis Tharp, leaf spot. Ind., Tex (1).
Dothiorella nelumbii Ell. & F.W.Anderson, on flower parts. Del., Md. (1).

Nuphar, yellow pondlily, cowlily

N. advena (Ait.) Ait. f., common spatterdock. Perennial aquatic herb of shallow fresh water occurring throughout the United States; a wildlife-food plant.

Entyloma nymphaeae (D.D.Cunn.) Setch., white smut. Conn., Ill., Mass., Wis.
Mycosphaerella pontederiae (Pk.) House, leaf spot. Maine, Mich., N.Y., Va., Wis.
Phyllosticta fatiscens Pk., leaf spot. Iowa, N.J., N.Y., Wis.
P. nymphaeacea Ell. & Ev.—Tex.
P. nymphaeicola Tehon & Daniels—Ill.

Nymphaea, waterlily

(1) *N. odorata* Ait., American waterlily, fragrant waterlily.
(2) *N. tuberosa* Paine, magnolia waterlily, tuberous waterlily.
(3) Other species.

Perennial aquatic herbs of great beauty; (1) and (2) are hardy and range throughout the Eastern and Central States; important food plants of wildlife. The species commonly cultivated in water gardens are mostly of African origin but much modified by hybridization.

Alternaria sp., leaf spot. Tex. (3).
Cercospora exotica Ell. & Ev., leaf spot. Ill. (3).
C. nymphaeacea Cke. & Ell. Ill., Maine, Mich., N.J., Tex. (1); Ill., Mich., Mo., Wis. (2); Miss., Tex., Va. (3).
C. nymphaeae Ell. & Ev.—Ala., Tex. (1).
Entyloma nymphaeae (D.D.Cunn.) Setch., white smut. Mass. to Va., Okla., and Wis. (1,2); Md., Mass., N.J., N.Y., Tex., Wis. (3).
Helicoceras nymphaearum (Rand) Linder, leaf spot. Md., N.J., N.Y. (3).
Mycosphaerella pontederiae (Pk.) House, leaf spot. Va. (1), Mich. (3).
Ovularia nymphaearum Allesch., leaf spot. Wash. (1,3); Md., N.Y., Wash. (3).
Phyllosticta fatiscens Pk., leaf spot. Vt. (1).
P. nymphaeacea Ell. & Ev.—Ala., Tex. (3).
Pythium spp., leaf and stem rot. Mass., N.Y., Wis. (1,2). Identified species include: ?*P. proliferum* d By., *P. marsipium* Drechs., and ?*P. undulatum* Peterson.

NYSSACEAE

Nyssa

(1) *N. aquatica* L., water tupelo. Range 25, 29,30.
(2) *N. sylvatica* Marsh., tupelo, black gum; including *N. biflora* Walt., swamp tupelo. Range 20,22,24 through 30.
(3) Other species.

Large, deciduous, ornamental trees, grown for their handsome foliage, especially in autumn.

Actinopelte dryina (Sacc.) Hoehn., leaf spot. Ala., Ill., Okla. (2).
Aplopsora nyssae (Ell. & Tracy) Mains, (II,III), rust. Ky., Miss., Tex., Va. (1); Md. to Ala., also Tex. (2).
Ceratostomella spp., blue stain of wood. General (3).
Cercospora nyssae Tharp, leaf spot. Tex. (2).
Cornularia hispida (Ell.) Sacc., on dead branches. N.J., Pa. (2).
Cryptodiaporthe paulula (Cke. & Ell.) Wehm., on branches. Ga. (2), N.J. (3).
Daedalea confragosa Bolt. ex Fr. and *D. unicolor* Bull. ex Fr., wood rot. Occasional (3).
Dermatella cucurbitaria Cke., on twigs. N.J. (2).
Endoconidiophora coerulescens Münch and *E. moniliformis* (Hedgc.) Davidson, wood stain. Southern States (3).
Fomes applanatus (Pers. ex Wallr.) Gill., butt rot, white-mottled heart rot. Widespread (3).
F. connatus (Weinm. ex Fr.) Gill., white spongy heart rot. Conn. (3).
F. geotropus Cke.—Fla. (3).
Fomitiporia earleae Murr., on logs. Gulf States (3).
Gnomoniella georgiana J. H. Miller & G. E. Thompson, on leaves. Ga. (2).
Hydnum erinaceus Bull. ex Fr., white spongy heart rot. N.C. (2); wood rot, sometimes on living trees. N.C. (3).
H. ochraceum Pers. ex Fr.—La. (3).
Isothea nyssae Berk. & Curt., on leaves. ?S.C. (1).
Lasiosphaeria pezizula (Berk. & Curt.) Sacc., grayish-olive stain of wood. (3).
Lentinus betulinus L. ex Fr., wood rot. Cosmopolitan (3).
L. tigrinus Bull. ex Fr., invades sapwood and sometimes heartwood of living trees after fire damage. La., Miss. (2).
Lenzites betulina L. ex Fr., wood rot. Cosmopolitan (3).
L. corrugata Klotzsch—Ind. (3). *?Daedalea.*
Leptothyrium dryinum Sacc.: SEE *Actinopelte dryina.*
Melanconis nyssaegena Ell. & Ev., on dead branches. N.J. (2).
M. sudans (Berk. & Curt.) Wehm. (*M. nyssagena* Ell. & Ev.)—N.J. (3).
Mycosphaerella nyssaecola (Cke.) Wolf (*Phyllosticta nyssae* Cke.), leaf spot. N.C. to Ala. (1); Mass. to Ga. and Mich. (2); Ga., Southeastern States (3).
Myriangium duriae Mont. & Berk., on scale insects infesting bark. Va. to Gulf States (3).
Nectria sp., canker. Conn. (2); *N. galligena* Pres.—Allegheny region (2).
Neopeckia diffusa (Schw.) Starb.—Ga. (3).
Pellicularia koleroga Cke., thread blight. La. (2).
Pezizella oenotherae (Cke. & Ell.) Sacc. (*Hainesia lythri* (Desm.) Hoehn., and *Sclerotiopsis concava* (Desm.) Shear & Dodge), on branches. Va. (3).
Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla. (2); Md., Ind., Tex. (3).
Phyllosticta nyssae Cke., leaf spot. Southeastern States to Tex. (3). Spermatial stage of *Mycosphaerella nyssaecola.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Phytophthora cactorum (Leb. & Cohn) Schroet., seedling top wilt. Mo. (2).

Pirostoma nyssae Tehon: See *Actinopelte dryina.*
Pleurotus ostreatus Jacq. ex Fr., invades sapwood and sometimes heartwood of living trees after fire damage. La., Miss. (2).
Polyporus spp., wood rot of logs and timber, sometimes on living trees. (3). Species recorded include: *P. adustus* Willd. ex Fr.—Md., Miss.; *P. cinnabarinus* Jacq. ex Fr.; *P. galactinus* Berk.—Tenn.; *P. hirsutus* Wulf. ex Fr.—widespread; *P. mutabilis* Berk. & Curt.—Ark., La.; *P. pargamenus* Fr.—Ind.; *P. resinosus* Schrad. ex Fr.—Ind.; *P. rhipidium* Berk. —Ark.; *P. rigidus* Mont.—Ark., Miss.; *P. supinus* Sw. ex Fr.—Tex.; *P. versicolor* L. ex Fr.—widespread.
Poria spp., wood rot. (3). Species reported include: *P. ambigua* Bres.—Fla.; *P. robusta* Karst.—Ga.; *P. semitincta* (Pk.) Cke.; *P. versipora* Pers. ex Rom.
Schizophyllum commune Fr., on dead branches. Cosmopolitan (3).
Sclerotinia nyssaegena (Ell.) Rehm, on fallen fruits. N.J. (2).
Septobasidium spp., on scale insects on bark and branches. N.J. to Gulf States (3). Species recorded include: *S. curtisii* (Berk. & Desm.) Boed. & Steinm., *S. fumigatum* Burt, *S. langloisii* Pat., *S. pseudopedicellatum* Burt, *S. patouillardii* Burt.
Sphaeronema hispidulum Ell., on branches. N.J., Va. (2). (*S. hispidulum* Cda. has priority.).
Stagonospora nyssaecola Fairm., on twigs. N.Y. (2).
Stereum spp., wood rot. (3). Species reported include: *S. fuscum* Schrad. ex Quél.—La.; *S. hirsutum* Willd. ex Fr.—N.Y., Va.; *S. lobatum* (G. Kunze) Fr.—Miss.; *S. rameale* Schw.—Ind.; *S. purpureum* Pers.—Ind.
S. rameale Schw., may invade sapwood and sometimes heartwood of living trees after fire damage. La., Miss. (2).
Strumella coryneoidea Sacc. & Wint., canker. Northern Appalachians (2).
Trametes rigida Berk. & Mont., wood rot. Gulf States (2).
Trematosphaeria subcollapsa Ell. & Ev., on branches. N.J. (2).
Valsa ambiens Pers. ex Fr. and *V. nyssae* Cke., on dead branches. N.Y. to Va. (3).
Valsaria apatosa Cke. & Ell., on dead branches. N.J., N.Y., Va. (3).

OLEACEAE

Chionanthus

C. virginica L., fringetree.

Deciduous shrub or small tree of range 20, 25,27,28,29,30. Together with *C. retusa* Lindl. & Paxt., Oriental fringetree, cultivated in zones of intermediate hardiness.

Botryosphaeria pyriospora (Ell.) Sacc. (=*?B. ribis* Gross. & Dug.), on twigs. N.J., W. Va.
Calonectria polythalama (Berk.) Sacc., on bark. N.C., N.J.
Cercospora chionanthi Ell. & Ev., leaf spot. N.J. to N.C. and W. Va.
Cytospora chionanthi Ell. & Ev.: See *Valsa chionanthi.*
Daedalea confragosa Bolt. ex Fr., wood rot. Md.
Dermatea chionanthi Ell. & Ev., on branches. Md., W. Va.
Didymosphaeria chionanthi J. H. Miller & G. E. Thompson, on dead leaves. Ga.
Diplodia chionanthi Cke. & Ell.: See *Dothiorella diatrypea.*
Dothiorella diatrypea (Cke. & Ell.) Grove, on dead branches. N.J.
Hysterographium mori (Schw.) Rehm, on branches. Md., Va.
Phomopsis diatrypea (Sacc.) Grove, (?conidial stage of *Diaporthe chionanthi* Brun.=*D. eres* Nits.), on dead branches. N.J.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Md.
Phyllosticta chionanthi Thuem., leaf spot. N.J., W. Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Septoria chionanthi Cke., leaf spot. S.C., Tex.
S. eleospora Sacc., leaf spot. S.C., Tex.
Valsa chionanthi Ell. & Ev. (*Cytospora chionanthi* Ell. & Ev.), on dead branches. W. Va.

Forestiera

(1) *F. acuminata* (Michx.) Poir. (*Adelia acuminata* Michx.), Forestiera, swamp-privet.
(2) Other species.

Shrubs or small trees of southern and southwestern United States and the Pacific coast, several cultivated as ornamentals.

Cercospora bernardiae F. L. Stevens, on leaves. P.R.
Coleosporium minutum Hedgc. & Hunt, (II,III), rust. Fla., Tex. (1). O and I (*Peridermium minutum* Hedgc. & Hunt) on *Pinus* spp.
Microsphaera alni DC. ex Wint., powdery mildew. Ill., Tex. (1).
Phoradendron flavescens (Pursh) Nutt., mistletoe. Tex. *P. villosum* (Pursh) Nutt.—Calif., Oreg.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Puccinia peridermiospora (Ell. & Tracy) Arth. (*P. fraxinata* Arth.) (O,I), rust. Fla., Tex. (1). II and III on *Spartina* spp.

Forsythia, goldenbells

Forsythia spp., especially *F. suspensa* (Thunb.) Vahl and *F. viridissima* Lindl., forsythia, goldenbells.

Deciduous ornamental shrubs of Europe and Asia, widely cultivated in zone 5 and southward; also cultivated farther north in favorable sites.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Miss., N.J., Tex.
Alternaria sp., leaf spot. Iowa.
Gloeosporium sp., anthracnose. Okla.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Tex.
Phomopsis sp., stem galls. Ky.
Phyllosticta discincola Ell. & Ev., leaf spot. Md.
P. forsythiae Sacc.—Conn.
P. terminalis Ell. & G. Martin—Fla., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Sclerotinia sclerotiorum (Lib.) d By., twig blight. N.C.
Sclerotium rolfsii Sacc., southern blight. Ga.

Fraxinus, ash

(1) *F. americana* L., white ash.

Large, valuable forest tree, with durable wood. Range 20,22,23,24,25,27,28,29,30.

(2) *F. nigra* Marsh., black ash.

Small to medium-sized forest tree. Range 22, 24,25,26,27,28.

(3) *F. oregona* Nutt., Oregon ash.
Tall forest tree. Range 1,2,3,4,5.
(4) *F. pennsylvanica* Marsh., red ash, including var. *lanceolata* (Borkh.) Sarg. = *F. viridis* Michx. f., green ash.
Middle-sized forest trees. Range 15,18,20,21, 22,23,24,25,26,27,28,29,30; also range 12 and 17 for var. *lanceolata.*
(5) *F. quadrangulata* Michx., blue ash.
Tall timber tree. Range 22,23,24,25,27,28.
(6) *F. velutina* Torr., velvet ash, including a number of varieties.
Small trees of range 9,10,11,14,16,17,20.
(7) Other species.

Actinopelte dryina (Sacc.) Hoehn.—Ill. (1, and on *F. tomentosa* Michx. f.).
Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Iowa and Nebr. to Okla. (1).
Aleurodiscus spp. (*A. acerinus* (Pers. ex Fr.) Hoehn. & Litsch., *A. candidus* (Schw.) Burt, and *A. macrodens* Coker), on bark, often of living trees. Eastern States (7).
Botryodiplodia fraxini (Fr.) Sacc.: See *Diplodia infuscans.*
Botryosphaeria ribis Gross. & Dug., on branches. Ga. (4); Md., N.Y., Pa. (7).
Cercospora fraxini Ell. & Kell.: See *Cylindrosporium fraxini.*
Cercospora fraxinites Ell. & Ev., leaf spot. Tex. (1); Ala. (4); Fla., La., Tex. (7).
C. lumbricoides Turc. & Maf.—(7).
C. superflua Ell. & Holw.—Iowa (7).
C. texensis Ell. & Gall.—Tex. (4,7).
Cercosporella trichophila J.J.Davis, on leaves. Wis. (4), Fla. (7).
Chlorosplenium aeruginosum (Oed.) de N., green wood stain. Cosmopolitan (7).
Cornularia spina (Berk. & Rav.) Sacc. & Syd. (*Sphaerographium fraxini* (Pk.) Sacc.), on dead branches. Widespread (7).
Cryptosphaeria millepunctata Grev., on dead branches. N. Dak. (4).
Cucurbitaria fraxini Ell. & Ev., on branches. W. Va. (1), N. Dak. (4).
Cuscuta sp., dodder. Md., S. Dak. (4) and on var. *lanceolata* in nurseries; occasional (7).
Cylindrosporium californicum Earle: See *C. fraxini.*
Cylindrosporium fraxini (Ell. & Kell.) Ell. & Ev., leaf spot. N.Y., Md. to Mich., Wis., Ind., Iowa, Mo., Kans., and Miss., Tex., Pacific coast (1); Mich., Ohio (2); Calif. to Wash. (3); Mich. to Kans. and N. Dak., Minn., Mo., Tex., Wis. (4); Mo. (5); Okla. (6); Mass. to Wis., Minn., Ind., Iowa, Kans., Mo., Tex., Fla., and La., Pacific Coast States (7). Reports of *Marssonina fraxini* Ell. & J.J.Davis and *Piggotia fraxini* Berk. & Curt. also belong here. However, owing to the polymorphism of *Piggotia fraxini,* records are listed under *Marssonina* and *Piggotia to show* relationship of the conidial stage, *M. fraxini,* and the spermagonial stage, *P. fraxini,* to the perithecial stage of *Mycosphaerella effigurata* (Schw.) House.
C. fraxinicola Dearn. & House: See *C. fraxini.*
C. minus Ell. & Kell.: See *C. fraxini.*
C. viridis Ell. & Ev.: See *C. fraxini.*
Cytospora annularis Ell. & Ev., twig canker, dieback. North Central States (1); Iowa (2); Ind., Iowa (4); North Central States (7).
C. ceratophora Sacc., on branches. W. Va. (4).
C. fugax Bull. ex Fr., on branches. Maine (7).
C. minuta Thuem.—N.Y. (4), W. Va. (7).
Daedalea confragosa Bolt. ex Fr. and *D. unicolor* Bull. ex Fr., wood rot of logs and stumps, butt rot of trees. Occasional (7).
Daldinia concentrica (Bolt. ex Fr.) Ces. & de N. and *D. vernicosa* (Schw.) Ces. & de N., wood rot. Cosmopolitan (7).
Dendrophoma pruinosa (Fr.) Sacc., on dead branches. Maine to Mich. and W. Va. (7).
Diaporthe spp., on branches. Mich., N.Y. (7). No collections on *Fraxinus* in U.S. have been authenticated.
Dicoccum nebulosum Ell. & Ev., on leaves. Wis. (1).
Dimerosporium pulchrum Sacc., sooty mold. (7). Obsolete name; conidial stage is *Sarcinella heterospora* Sacc.
Diplodia infuscans Ell. & Ev. (=*D. inquinans* West.) and *Diplodia* sp., canker, dieback. Northeastern States (1,7). Fungi variously identified as *Diplodia, Haplosporella, Phoma, Macrophoma,* and *Sphaeropsis* are reported associated with branch cankers on *Fraxinus* spp., especially in the Northeastern States. In part, the conidial stage of *Physalospora obtusa* (Schw.) Cke.
D. rhizogena Ell. & Barth., on exposed roots. Kans. (4).
Dothidea collecta (Schw.) Ell. & Ev.—(4).
Dothiorella concaviuscula Ell. & Barth., on branches. (7).
D. everhartii Sacc.—(7).
D. fraxinicola Ell. & Ev., branch canker. Iowa (1,4); Iowa, Kans., Nebr. (7).
Favolus alveolaris (DC. ex Fr.) Quél., on dead wood. Cosmopolitan (7).
Fomes spp. (*F. applanatus* (Pers. ex Fr.) Gill., *F. conchatus* (Pers. ex Fr.) Gill., *F. densus* Lloyd, *F. fraxineus* (Bull. ex Fr.) Cke., *F. igniarius* (L. ex Fr.) Kickx., *F. meliae* (Underw.) Murr., *F. pinicola* (Sw. ex Fr.) Cke., *F. salicinus* Pers. ex Gill., and *F. torulosus* (Pers.) Lloyd), wood rot of dead or sometimes living trees, and logs and timber. Eastern and Southern States (7).
F. australis Cke.—Fla. (7).
F. fraxinophilus (Pk.) Sacc., heart rot of living trees. Pa. to Va. and Ind., also Miss., Okla., and Iowa (1); N. Dak. and Mont. to Ariz. and N. Mex. (4); Ariz., N. Mex. (6); Eastern and Central States to the Great Plains (7).
F. geotropus Cke.—(7).
Ganoderma lucidum (Leyss. ex Fr.) Karst., trunk rot. La., Miss. (7).
Gloeodes pomigena (Schw.) Colby, on branches. Ind. (7).
Gloeosporium aridum Ell. & Ev., leaf spot, anthracnose, leaf scorch. Mass. to N.C., Iowa, and Wis. (1); Wis. (2); Iowa, W. Va. (4); Calif. (6); Eastern and Central States (7).
G. decipiens Ell. & Ev.: See *Cylindrosporium fraxini.*
G. everhartii Ell., on leaves. Del. (7).
G. fraxineum Pk., on leaves. Mich., N.Y., Wis. (4); Ill. (5); N.Y. to Wis. (7).
G. fraxini (Harkn.) Ell. & Ev.: See *Cylindrosporium fraxini.*
G. punctiforme Ell. & Ev.—Pa. (7).
Haplosporella pennsylvanica (Berk. & Curt.) Petr. & Syd.: See *Diplodia infuscans* = *?Physalospora obtusa.*
Helicobasidium purpureum (Tul.) Pat., collar rot. Tex. (7).
Hendersonia fraxini Ell. & Barth., on dead branches. Kans. (4).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Hydnum erinaceus Bull. ex Fr.—(7).
Hypoxylon spp.—Ga. (7).
?H. tinctor (Berk.) Cke.—Ga. (7).

Hysterographium fraxini (Pers. ex Fr.) de N., on dead branches. Oreg. (3); Maine, Mich., N. Dak., Oreg. (7). Conidial stage = *Myxosporium rostrupii* Ferd. & Jorg.

Laestadia fraxinicola (Curt. & Pk.) Sacc., on leaves. (1)

Lentinus tigrinus Bull. ex Fr., sapwood rot. Miss. (7).

Leptosphaeria fraxini Ell. & Ev., on leaves. Mo. (1).

Lophodermium punctiforme (Fr.) Fckl., on leaves. N.Y. (7).

Macrophoma hyalina (Berk. & Cke.) Berl. & Vogl.: See *Diplodia infuscans* = *?Physalospora obtusa.*

Marssonina fraxini Ell. & J.J.Davis, leaf spot. Wis. (2,7). See also *Mycosphaerella effigurata.*

Meloidogyne spp., root knot nematodes. Okla. (4); Ariz. (6); Ariz., Md., Okla. (7).

Microsphaera alni (DC.) Wint. —Ill. (7).

Microthyrium microscopicum Desm., on leaves. Maine (7).

Mycosphaerella sp.—on *F. caroliniana* Mill., in Ga.

M. effigurata (Schw.) House, leaf spot. Maine to Miss., Okla., and Iowa (1); N.C., Wis. (2); Oreg., Wash. (3); Northeastern States to Tex. (4); Ind., N.Y., N.C., N. Dak., Tenn., Va., and throughout the U.S. on various species; on *F. biltmoreana* Beadle, in Ga.

M. fraxini Niessl, on fallen leaves. Va. (7).

M. fraxinicola (Schw.) House, leaf spot. Conn. to Fla., Kans., and Minn. (1); N.Y. to N.C., Ga., and Ill. (4); Kans., Mo. (5); Okla. (6); widespread east of Rocky Mountains (7); on *F. biltmoreana*, in Ga.

M. maculiformis (Pers. ex Fr.) Schroet., on fallen leaves. Maine (7).

Nectria cinnabarina Tode ex Fr., on branches. La., Maine (7).

N. coccinea Pers. ex Fr., branch and trunk canker. N.Y. (2); Northeastern States (7).

N. galligena Bres., canker. N.Y. (2).

N. sphaerospora Ell. & Ev. (*Chilonectria crinigera* (Ell. & Ev.) Sacc.), on dead bark. Nebr. (4).

Phoma infossa Ell. & Ev.: See *Cytospora minuta.*

Phoradendron flavescens (Pursh) Nutt., mistletoe. Ind. (5); South Central States to Pacific coast (7).

P. flavescens var. *macrophyllum* Engelm., mistletoe. Ariz., N. Mex. (6); South Central States to Pacific coast (7).

P. longispicum Trel., mistletoe. Calif. (3).

Phyllactinia corylea Pers. ex Karst., powdery mildew. Mich. and Ohio to Iowa (1); Central States (2); Calif. to Wash. (3); Mich. and Ind. to Kans. and N. Dak. (4); Ind., Mich. (5); Northeastern and Central States, Pacific coast (7).

Phyllosticta fraxini Ell. & G.Martin: See *Cylindrosporium fraxini.*

Phyllosticta fraxinicola (Currey) Ell. & Ev. (*P. fraxini*): See *Cylindrosporium fraxini.*

P. innumera Cke. & Harkn. (=*?P. viridis*), leaf spot, leaf drop. Calif. to Wash. (3); Calif. (7).

P. viridis Ell. & Kell.: See *Mycosphaerella fraxinicola.*

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (7). (On all *Fraxinus* spp. tested.)

Physalospora obtusa (Schw.) Cke., on branches. N.Y. to Ala. (1); New England to Ala. (7). See also *Diplodia infuscans.*

Piggotia fraxini Berk. & Curt., leaf spot. Maine to Miss., Okla., and Iowa (1); N.C., Wis. (2); Oreg., Wash. (3); Northeastern States to Tex. (4); general east of Plains, Wash. (7). See also *Mycosphaerella effigurata.*

?Pleosphaeria echinata (Ell. & Ev.) J.H.Miller—(4).

Pleurotus ostreatus Jacq. ex Fr.

Polyporus spp. (*P. admirabilis* Pk., *P. adustus* Willd. ex Fr., *P. biformis* Klotzsch, *P. cinnabarinus* Jacq. ex Fr., *P. dichrous* Fr., *P. gilvus* (Schw.) Fr., *P. hirsutus* Wulf ex Fr., *P. pargamenus* Fr., *P. pinsitus* Fr., *P. pulchellus* Schw., *P. spraguei* Berk. & Curt., *P. spumeus* Sow. ex Fr., *P. squamosus* Huds. ex Fr., *P. sulphureus* Bull. ex Fr., *P. versicolor* L. ex Fr., *P. zonatus* Fr.), wood rot, mostly of logs and dead trees, sometimes wound rot of living trees (7).

P. albidus Schaeff. ex Fr.—N.Y. (7).

P. fissilis Berk. & Curt.—La. (7).

P. hispidus Bull. ex Fr., heart rot of living trees. Mich. (2).

P. lacteus Fr.—N.Y. (7).

P. tulipiferus (Schw.) Overh., on dead wood. (7).

Poria spp. (*P. langloisii* Murr., *P. nitida* Alb. & Schw., *P. punctata* Fr., *P. semitincta* (Pk.) Cke., *P. undata* Pers. and others) wood rot of logs and slash. (7).

P. ambigua Bres.—Southern States (7).

P. cocus Wolf—Vt. (7).

Puccinia peridermiospora (Ell. & Tracy) Arth., (O,I), rust. General east of the Great Plains (1,7); Mass. to Md. and Minn. (2); general (4); Ill., Pa. (5); Kans., Tex. (6). II and III on *Spartina* spp.

Ramularia fraxinea J.J.Davis, on leaves. Fla., Wis. (7).

Rhizoctonia crocorum (Pers.) DC.: See *Helicobasidium purpureum.*

Rhizoctonia solani Kuehn, seedling blight. Okla. (7).

?Rosellinia aquila (Fr.) de N.—Ga. (7).

Schizophyllum commune Fr., wood rot, sometimes on living trees. Cosmopolitan (7).

Schizothyrella fraxini Ell. & Ev., on fallen leaves. Kans. (4).

?Scoleconectria polythalama (Berk.) Seaver—Ga. (4).

Septobasidium spp. (*S. curtisii* (Berk. & Desm.) Boed. & Stein, *S. patouillardii* Burt, *S. pseudopedicellatum* Burt, *S. schweinitzii* Burt), felt fungus. N.C. to Fla. (7).

Septogloeum sp., on leaves. Nebr. (7).

S. fraxini Harkn.: See *Cylindrosporium fraxini.*

Septoria spp. (*S. besseyi* Pk., *S. fraxini* Desm., *S. fraxini* West., *S. leucostoma* Ell. & Ev., and *S. submaculata* Wint.): See *Cylindrosporium fraxini.*

Sphaerella quadrangulata Ell. & Ev.—(5).

Sphaerographium fraxini (Pk.) Sacc.: See *Cornularia spina.*

Sphaeronema fraxini Pk. and *S. spina* Berk. & Rav.: See *Cornularia spina.*

Sphaeropsis spp. (*S. biformis* Pk., *S. fertilis* Pk., and others), canker. Occasional (4); (*S. biformis, S. fertilis, S. hyalina* Berk. & Curt., *S. nubilosa* Ell. & Barth., *S. profundae* Tehon & Daniels), on branches, ?canker. Widespread (7). In part the conidial stage of *Physalospora obtusa* (Schw.) Cke. and *P. mutila* (Fr.) N.E.Stevens. See also *Diplodia infuscans.*

?Sphaerostilbe coccophila Tul.—Ga. (4).

Stereum spp. (*S. fuscum* (Schrad. ex Fr.) Quél., *S. gausapatum* Fr., *S. versiforme* Berk. & Curt., and others), wood rot of logs and timber (7).

Trametes hydnoides Sw. ex Fr., wood rot. Ark., La., Tex. (7).

T. malicola Berk. & Curt., brown spongy rot. N.Y. (7).

T. rigida Berk. & Mont., on wood. Ark., La. (7).

Tympanopsis euomphala (Berk. & Curt.) Starb.—Ga. (5).

?Uncinula circinata Cke. & Pk., powdery mildew. Iowa (4 var. *lanceolata*).

Valsa spp. (*V. ambiens* Pers. ex Fr., *V. grisea* Pk., and *V. leucopsis* Ell. & Ev.), on branches. Widespread (7).

V. fraxina Pk.—Ga. (4), widespread (7).

Venturia fraxini Aderh.—Fla. (7).

Verticillium albo-atrum Reinke & Berth., wilt. Colo. (4).

Jasminum, jasmine

Jasminum spp.

Deciduous or evergreen shrubs, with attractive, fragrant flowers; some are warm-climate plants, mostly from Europe and Asia; several species commonly cultivated as ornamentals in zones 6 and 7.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Md.
Calonectria polythalama (Berk.) Sacc.—Ala.
Cephaleuros virescens Kunze, green scurf. Fla.
Choanephora infundibulifera (Curr.) Sacc., blossom blight. Fla.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Colletotrichum gloeosporioides Penz., leaf spot. Fla., Tex.
Corticium galactinum (Fr.) Burt, white root rot. Md.
Haplosporella jasmini Ell. & Ev., on twigs. Ala.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Marasmius ramealis Bull. ex Fr., on dead roots. Tex.
Meloidogyne sp., root knot nematodes. Fla.
Phomopsis sp., stem gall. Fla., Tex.
Physalospora obtusa (Schw.) Cke., on twigs. Ala.
Rhabdospora jasmini (Schw.) Cke., on dead stems. Pa. (Preempted name.)
Sclerotium rolfsii Sacc., southern wilt. Fla.
?VIRUS — Variegation or infectious chlorosis, graft-transmissible in some cases, in cultivated forms.

Ligustrum, privet

I. Evergreen Species

Ligustrum spp., especially *L. japonicum* Thunb., Japanese privet, and *L. lucidum* Ait., glossy privet.

Handsome shrubs or small trees of eastern Asia, cultivated for ornament and street trees, zone 7.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Occasional.
Cephaleuros virescens Kunze, green scurf. Gulf States.
Cercospora adusta Heald & Wolf, leaf spot. Ala.
C. ligustri Roum.—Ga., Miss., Tex.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Glomerella cingulata (Ston.) Spauld. & Schrenk, canker, dieback. Occasional.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Southern States.
Pellicularia koleroga Cke., thread blight. Fla.
Phomopsis sp., on branches. Tenn.
Phyllosticta sp., on leaves. Tex., Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
CHLOROSIS—mineral deficiency. On calcareous soils in the Gulf States.

II. Deciduous to Half Evergreen Species

Ligustrum spp., including the following:

L. amurense Carr., Amur privet, a shrub or small tree, native of northern China, hardy north to zone 3.

L. ovalifolium Hassk., California privet, a handsome shrub or small tree, native of Japan, hardy north to zone 5.

L. vulgare L., common privet, (including numerous horticultural forms), a shrub or small tree, native of Europe, hardy north to zone 4 and naturalized in the Eastern States.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Occasional, Tex.
Aphelenchoides fragariae (Ritz.-Bos) Christie, leaf nematode.
Armillaria mellea Vahl ex Fr., root rot. Ark., Calif., Miss., Tex.
Botryosphaeria ribis Gross. & Dug., on branches. Ala., Ga.
Cercospora adusta Heald & Wolf, leaf spot. Del. to Ala. and Tex.
C. ligustri Roum.—Gulf States.
Clitocybe monadelpha Morg., root rot. Ark.
Cuscuta sp., dodder. Tex.
Cytospora sp., ?dieback. Okla. (on *L. ovalifolium*).
Diaporthe eres Nits., on dead twigs. N.Y., Va.
D. ligustrina Ell. & Ev.: SEE *?D. eres.*
Exosporium concentricum Heald & Wolf, leaf spot. Tex.
Fomes applanatus (Pers. ex Fr.) Gill., collar rot. N.Y.
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, canker, dieback. General (especially on *L. vulgare*); Conn. to Ala., Tex., and Nebr.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Southern States.
Microsphaera alni DC. ex Wint., powdery mildew. Ind., N.J., Ohio.
Pellicularia koleroga Cke., thread blight. Fla.
Pezizella oenotherae (Cke. & Ell.) Sacc., on leaves and stems.
Phoma ligustrina Sacc.: SEE *?Diaporthe eres.*
Phomopsis sp., stem gall. Md., Tex. (on *L. amurense* and *L. vulgare*).
P. ligustri-vulgaris Petr., Phomopsis blight. Pa.
Phyllosticta ovalifolii Brun., leaf spot. Md., Miss., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Okla., Tex.
Physalospora obtusa (Schw.) Cke., on branches. Ala., Va.
Phytophthora sp., root rot. Calif.
Polyporus pinsitus Fr.—Tex.
P. versicolor L. ex Fr., wound rot. Cosmopolitan.
Ramularia sp., leaf blight. N.J., leaf spot—Wash.
Rosellinia necatrix (R.Hart.) Berl., root rot. Calif.
Stereum hirsutum Fr., wood rot. Cosmopolitan.
VARIEGATION—?virus. Variegated forms of privet are in cultivation; graft-transmission has been shown in some.
CHLOROSIS—manganese deficiency. Fla.

Olea

O. europaea L., olive.

A small evergreen tree of the Mediterranean region; grown for fruit in California and Arizona and for ornament in the South and under glass.

Armillaria mellea Vahl ex Fr., root rot. Calif., Tex.
Asterina oleina Cke., black leaf spot. Fla., Ga.
Cercospora ?cladosporioides Sacc., fruit and leaf spot. Calif.
Cuscuta indecora Choisy, stem gall. Calif.
Cycloclonium oleaginum Cast., peacock spot, leaf spot. Calif.
Gloeosporium olivarum Alm., anthracnose. Calif.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Pratylenchus musicola (Cobb) Filip., in roots. Calif.
Pseudomonas savastanoi (E. F. Sm.) F. L. Stevens, bacterial knot. Calif.
BITTER PIT AND DRY ROT OF FRUIT—physiological, associated usually with overnutrition. Calif.
EXANTHEMA, OR DIEBACK—physiological, associated with deficiency of organic matter and poor drainage. Calif.
FRUIT PIT—boron deficiency. Calif.
SOFT NOSE, OR BLUE NOSE—physiological, limited to var. Sevillano, possibly related to moisture supply. Calif.

Osmanthus

(1) *O. americanus* (L.) Gray, wildolive, devilwood.
(2) *O. fragrans* Lour. (*Olea fragrans* Thunb.), sweetolive.
(3) *O. ilicifolius* (Hassk.) Mouillef. (*Olea aquifolium* Benth. & Hook.), holly osmanthus.
(4) Other species.

Evergreen shrubs or small trees: (1) of range 29,30; (2) of eastern Asia; and (3) of Japan; (1) has fragrant flowers; (2) cultivated for ornament in the open in the South and as a pot plant under glass; (3) cultivated for ornament, zone 6.

Armillaria mellea Vahl ex Fr., root rot. Calif. (2).
Asterina sp., black leaf spot. Miss. (2).
A. asterophora Ell. & G.Martin and *A. discoidea* Ell. & G.Martin, black leaf spot. Fla., Ga. (1).
Asterinella intensa (Cke. & Mass.) Th., black leaf spot. T.H. (4).
Aulacostroma osmanthi F.L.Stevens & Ryan, on leaves. T.H. (4).
Calonectria erubescens (Roberge) Sacc., on leaves following *Meliola*. Fla. (1).
Calothyriella osmanthi F.L.Stevens & Ryan, on leaves. T.H. (4).
Calothyrium osmanthi F.L.Stevens & Ryan, on leaves. T.H. (4).
Capnodium elongatum Berk. & Desm., sooty mold. Tex. (3).
Fomes hawaiiensis Lloyd, wood rot. T.H. (4).
Fumago salicina (Pers. ex Fr.) Tul., sooty mold. Tex. (3).
Gloeosporium oleae Patterson, on leaves. Md. (2). ?Conidial stage of *Glomerella cingulata* (Ston.) Spauld. & Schrenk.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Isariopsis carnea Ell. & G.Martin, on leaves. Fla. (1).
Lembosia oleae Tracy & Earle, black mildew. Miss. (1).
Meliola amphitricha Fr., black mildew. Fla. to Miss. (1).
M. osmanthi Syd., black mildew. T.H. (4).
Meloidogyne spp., root knot nematodes. (3).
Mycosphaerella oleina (Cke.) J.H. Miller, on leaves. Ga. (1).
Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla. (1).
Phyllosticta oleae Ell. & G.Martin, leaf spot. Fla., N.C. (1); Tex. (3).
P. osmanthi Tassi, on leaves. On *O. fortunei* Carr., La.
P. sinuosa Ell. & G.Martin. Fla., Miss. (1); Tex. (3).
P. terminalis Ell. & G.Martin. Fla. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Rosellinia necatrix (Hartig) Berl., root rot. Calif. (3).
Septoria sp., on ?leaves. Miss. (1).
Venturia formosa Ell. & G.Martin, on leaves. Fla. (1).
Zukalia (Asterina) purpurea (Ell. & G.Martin) Th., black leaf spot. Fla. (1).

Syringa, lilac

(1) *S. amurensis* Rupr., Amur lilac.

Shrub or small tree of Manchuria, northern China, cultivated for ornament, zone 4.

(2) *S. persica* L., Persian lilac.

Shrub of western Asia, cultivated chiefly in the var. *intergrifolia* Vahl., zone 5; also in hybrids with *S. vulgaris*.

(3) *S. vulgaris* L., common lilac.

Shrub or small tree of southeastern Europe, long cultivated for ornament, zone 3; sometimes locally naturalized. Records on horticultural lilacs in general are given here, although some of the hosts belong to hybrids of this with various Asiatic species.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Conn. (3).
Alternaria spp., on spotted leaves, probably mostly secondary but sometimes extending other lesions; both *A. tenuis* Auct. and *A. brassicae* (Berk.) Sacc. types occur. Cosmopolitan (3).
Armillaria mellea Vahl ex Fr., root rot. Calif., Miss. (3).
Ascochyta syringae Bres., on leaves. Oreg., Wis. (3).
Botrytis cinerea Pers. ex Fr., gray-mold blight. Northeastern States, Pacific Northwest (3).
Cercospora lilacis (Desm.) Sacc., leaf spot. Miss. (2); widespread, Tex. (3).
C. macromaculans Heald & Wolf. Iowa, Okla., Tex., Wis. (3).
Cladosporium sp. (*?C. herbarum* Lk.), leaf blotch, probably mostly secondary. Cosmopolitan (3).
Dendrophoma albomaculans (Schw.) Starb. and *D. syringae* Dearn., on twigs. N.Y. (3).
Diaporthe medusaea Nits., on branches. Maine (3).
Dothiorella berengeriana Sacc., on branches. Ohio (3).
Gloeosporium syringae Allesch. (*?Glomerella cingulata* (Ston.) Spauld. & Schrenk), ?shoot blight. Conn., Mass. (3).
Heterosporium syringae Oud., leaf blotch following bacterial blight. N.J. (3).
Hymenochaete agglutinans Ell., stem girdle. Conn. (3).
Macrophoma halstedii (Ell. & Ev.) Tassi, leaf spot. Conn., N.J., N.Y. (3).
Macrosporium sp.: SEE *Alternaria* and *Pleospora*.
Microsphaera alni DC. ex Wint., powdery mildew. Ill., Iowa, Minn., Nebr. (2); general (3).
Myxosporium depressum Sacc., on twigs. N.Y., Ohio, Va. (3).
Pellicularia koleroga Cke., thread blight. Fla., Miss., N.C. (3).
Phomopsis depressa (Lév.) Trav., on twigs and capsules. N.Y., Ohio (3). Conidial stage of *Diaporthe eres* Nits.
Phyllosticta sp., leaf spot. Mass. (3).
P. halstedii Ell. & Ev.: See *Macrophoma halstedii*.
P. porteri Tehon & Daniels. Ill. (3).
P. syringae West. (*?Ascochyta syringae*.) Wash. (3).
P. syringella (Fckl.) Rab. (as *Phoma syringae* Fckl.), on leaves. N.Y., Wis. (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1); Ariz., Tex. (3); also on *S. chinensis* Willd.
Physalospora obtusa (Schw.) Cke., on twigs and branches, ?dieback. Mass. to Va. and Ohio (3).

Phytophthora cactorum (Leb. & Cohn) Schroet., blossom blight, dieback. Iowa, Mass., Md., Minn., N.J. (3).
P. syringae Kleb., shoot blight. Md., N.Y. (3).
Pleospora herbarum (Pers. ex Fr.) Rabh. (*Stemphylium botryosum* Wallr.), secondary leaf spot. Md. (3).
Polyporus gilvus (Schw.) Fr., wood rot. Md. (3).
P. versicolor L. ex Fr.—Mo., N.C., N.Y. (3).
Pseudomonas syringae Van Hall, bacterial blight, twig canker. Northeastern States to Ala., Tex., and Ill.; Pacific Coast States (3).
Sclerotinia sclerotiorum (Lib.) d By., shoot blight. Wash. (3).
Sphaeropsis syringae Pk. & G.W.Clint., on leaves and twigs, probably secondary. N.J., Pa. (3).
Stereum purpureum Pers., wood rot. Okla. (3).
Thielaviopsis basicola (Berk.) Ferr., root rot. Conn. (3).

MOSAIC—?mosaic ring spot virus. Mich., Minn. (3).
WITCHES'-BROOM—suspected virus. Md. (on *Syringa* sp.)
GRAFT BLIGHT—incompatibility of lilac scion on privet stock. Occasional. A "graft blight" in England is attributed to a virus.

ONAGRACEAE

Boisduvalia

(1) *B. densiflora* (Lindl.) S.Wats., spike-primrose.
(2) Other species.

Annual herbs of the Pacific States; (1) sometimes grown in gardens.

Puccinia glabella Holw. (II,III), rust. Nev., Oreg., Utah (2). O and I unknown.
P. oenotherae Vize (O,I,II,III). Calif., Idaho, Nev., Oreg., Wash. (1,2).
P. vagans (DC.) Arth. var. *epilobii-tetragoni* (DC.) Arth. (O,I,II,III). Calif., Nev. (1); Idaho, Nev., Oreg., Utah (2).

Clarkia

(1) *C. elegans* Dougl.
(2) Other species.

Annual herbs with showy flowers, occurring mostly in California and other Pacific Coast States; (1) is widely cultivated in gardens.

Alternaria tenuis Auct., secondary leaf spot. Calif. (1).
Botrytis cinerea Pers. ex Fr., gray-mold leaf spot, stem canker. Calif., N.Y. (1).
Colletotrichum sp., anthracnose. Pa. (1).
Fusarium sp., stem rot, wilt. Calif. (1).
Peronospora arthuri Farl., downy mildew. Calif. (1).
Phytophthora cactorum (Leb. & Cohn) Schroet., stem rot. N.Y. (1).
Puccinia oenotherae Vize (O,I,II,III), rust. Calif., Wash. (1,2); Idaho, Nev., Oreg. (2).
Pucciniastrum pustulatum (Pers.) Diet. (II,III), rust. N.Y., Alaska (1).
Pythium debaryanum Hesse, damping-off. Calif. (1).
Rhizoctonia solani Kuehn, root rot, damping-off. Conn. (1).
Synchytrium fulgens Schroet., leaf gall. Calif. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Calif. (1).

YELLOWS—virus (*Chlorogenus callistephus* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif. (1); also Eastern aster yellows (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.) ?N.Y.

Epilobium, willow-herb

(1) *E. angustifolium* L., great willow-herb, fireweed.
(2) *E. latifolium* L.
(3) Other species.

Perennial herbs: (1) of meadows and burned-over woodlands, widely distributed in the North Temperate Zone; an important honey plant and sometimes grown in wild gardens; also of forage value; (2) and (3), occurring in the Far North and West, are of similar but less utility.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska (1,3).
Cercospora montana (Speg.) Sacc., leaf spot. Calif., Tex., Utah, Wash., Wis., Wyo. (1); N.Dak., N.H., N.Mex., Oreg., Wis. (3). *C. epilobii* W.G.Schneid., although earlier, was published without description, and the two probably are synonymous.
Diaporthe racemula (Cke. & Pk.) Sacc., on stems. N.Y. (1).
Didymosphaeria fenestrans (Duby) Wint., on stems. Idaho, Alaska (1).
Discosia bubakii Kab. (*Hyaloceras kriegerianum* (Bres.) Died.), leaf spot. N.Y., Wis. (1).
Doassansia epilobii Farl., leaf smut. Colo., N.H. (3).
Dothidella adusta (Fckl.) Lind, on leaves. Alaska (1).
Erysiphe polygoni DC., powdery mildew. Wash. (3).
Euryachora epilobii (Fr.) Hoehn., on stems. N.Y. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Leptosphaeria cylindrospora Niessl & Auers., dead stems. Colo., Idaho, Wash. (1).
Meloidogyne sp., root knot nematodes. (3).
Microsphaera sp., powdery mildew. Ill. (3).
Nectria cinnabarina Tode ex Fr., on stems. Alaska (1).
Pezizella oenotherae (Cke. & Ell.) Sacc., on leaves. Maine (1).
Phyllosticta chamaeneri Allesch., leaf spot. Oreg. (1).
P. wyomingensis Solh.—Wyo. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Plasmopara epilobii (Rabh.) Schroet., downy mildew. Alaska (2); Ill., N.Y. (3).
Puccinia epilobii DC. (III), rust. Mich., Wyo. (3).
P. extensicola Plowr. var. *oenotherae* (Mont.) Arth. (O,I), rust. Colo. (1). II and III on *Carex* spp.
P. gigantea Karst. (III). Idaho, Mont., Tex., Wash., Wyo., Alaska (1).
P. oenotherae Vize (O,I,II,III). Calif. (3).
P. scandica Johans. (III). Utah, Wash., Wyo. (3).
P. vagans (DC.) Arth. var. *epilobii-tetragoni* DC. (O,I,II,III). N.Dak. to N.Mex., Calif., and Alaska (3).
P. veratri (DC.) Duby (O,I). N.H., also Mont. to Utah, Wash., and Alaska (3). II and III on *Veratrum* sp.
Pucciniastrum pustulatum (Pers.) Diet. (II,III), rust. Northeastern States to Pacific Northwest, also Colo., N.Mex., and Calif. (1,3); Alaska (2). O and I on *Abies* sp.
Ramularia cercosporoides Ell. & Ev., leaf spot. Mont., Tex., Wash., Wyo (1); Alaska, Wyo. (3).
R. karstenii Sacc.—Colo. (1).
R. punctiformis (Schlecht.) Hoehn.—Wis. Said to be conidial stage of *Mycosphaerella epilobii* Jaap.

Sclerotium rolfsii Sacc., southern blight. Tex. (1).
Septoria epilobii West., leaf spot. Calif., Del., Ill., Vt., Wis., Alaska (3).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Calif., Iowa, Kans., Mich., N.J., Oreg., S.Dak., Wash., Wis., Wyo., Alaska (3).
YELLOWS—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif. (3).

Fuchsia

Fuchsia spp.

Shrubs or small trees with showy flowers, mostly of Mexico and western South America, commonly grown as house plants and summer bedding plants, or in the open in California. The horticultural forms, collectively *F. hybrida* Hort., are derived chiefly from *F. magellanica* Lam. and *F. fulgens* Moc. & Sessé.

Botrytis cinerea Pers. ex Fr., gray-mold blight. W.Va., Alaska.
Didymella fuchsiae Cke. & Harkn., on stems. Calif.
Diplodia fuchsiae Cke. & Harkn., on stems. Calif.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Calif., Md., Oreg.
Phomopsis sp., ?dieback. Va.
Pucciniastrum fuchsiae Hirat. (*Uredo fuchsiae* Arth. & Holw.), rust. Ohio, in greenhouse.
Pythium rostratum Butl. and *P. ultimum* Trow, rootlet rot. ?Calif.
Septoria sp., leaf spot. Okla.
Verticillium albo-atrum Reinke & Berth., wilt. Calif.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif.

Gaura

(1) *G. biennis* L.
(2) *G. coccinea* Pursh
(3) *G. sinuata* Nutt.
(4) Other species.

Mostly perennial herbs of plains and waste ground in the Central and Western States, (2) also in the East; sometimes grown in wild gardens and some are useful to wildlife.

Cercospora flagellifera Atk.—Okla. (4).
C. gaurae Kell. & Swing., leaf spot. N.Y. (1); Okla., Tex. (1,3).
Erysiphe polygoni DC., powdery mildew. Colo., Tex. (4).
Mycosphaerella sp. (*Sphaerella granulata* Ell. & Ev.), on stems. Kans. (1).
Peronospora arthuri Farl., downy mildew. Kans., Nebr. (4).
Pezizella oenotherae (Cke. & Ell.) Sacc., on leaves. Va. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,4).
Puccinia extensicola Plowr. var. *oenotherae* (Mont.) Arth. (O,I), rust. Nebr. (2); Tex. (3); Colo., Nebr., Tex. (4). II and III on *Carex* spp.
Septoria gaurina Ell. & Kell., leaf spot. Ill., Kans., Okla. (1); N.Dak., Okla. (2); Kans., Nebr., N. Mex., Tex. (4).
S. oenotherae West.—Tex. (4).
Synchytrium fulgens Schroet., leaf gall. Tex. (4).
Uromyces plumbarius Pk. (O,I,II,III), rust. N.Y. to Va., Tex., and Wis. (1); N.Dak. and Mont. to Miss. and N.Mex. (2); Okla., Tex. (3); also on other species in the general range.
YELLOWS—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif. (4).

Gayophytum

Gayophytum spp., groundsmoke.

Annual herbs of the Western States; some of ornamental value or useful to wildlife.

Cercospora gayophyti Ell. & Ev., leaf spot. Calif.
Puccinia vagans (DC.) Arth. (O,I,II,III), rust. On various species from N.Dak. to N.Mex., Calif., and Wash.; two varieties, *epilobii-tetragoni* DC. and *gayophyti* (Billings) Arth., are distinguished technically.
Ustilago gayophyti Harkn., seed smut. Calif., Nev., Oreg., Utah.

Godetia

(1) *G. amoena* G.Don, farewell-to-spring.
(2) *G. grandiflora* Lindl.
(3) Other species.

Annual herbs of the Pacific States, chiefly California; grown for ornament.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.
Peronospora arthuri Farl., downy mildew. Calif. (1).
Puccinia oenotherae Vize (O,I,II,III), rust. Calif., Oreg. (1); Calif. (2); Calif., Nev., Wash. (3).
P. vagans (DC.) Arth. (O,I,II,III). Calif. (3).
Pucciniastrum pustulatum (Pers.) Diet. (II,III), rust. Alaska (2). O and I on *Abies*.
Pythium ultimum Trow, root rot. Mo. (2).
P. vexans d By. ?Calif. (2).
Rhizoctonia solani Kuehn, damping-off. Ill.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.) Calif. (2).
YELLOWS—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif. (2).

Jussiaea, waterprimrose

(1) *J. californica* (S.Wats.) Jepson
(2) *J. decurrens* (Walt.) DC.
(3) Other species.

Mostly perennial herbs of marshy habitats in California (1), in the Southern States (2), or tropical America; grown for ornament in aquatic gardens and are useful to wildlife.

Aecidium betheli Arth. (I), rust. Calif. (1).
Alternaria sp., leaf spot. Okla. (2).
Cercospora jussiaeae Atk., leaf spot. Ala., Okla., Tex. (2,3).
Colletotrichum jussiaeae Earle, leaf spot. Ala., Tex. (2).
Puccinia jussiaeae Speg. (O,I,III), rust. Miss. (2).
Septoria jussiaeae Ell. & Ev., leaf spot. Ala., Fla., La., Tex. (3).
Uredo guaynabensis Kern & Whet. (II), rust. Fla., P.R. (3).

Ludwigia, false-loosestrife

(1) *L. alternifolia* L., seedbox.
(2) *L. palustris* (L.) Ell., waterpurslane.

(3) Other species.

Annual or perennial bog herbs, mostly in the Southeastern and Southern States; sometimes grown in aquatic gardens and useful to wildlife.

Cercospora ludwigiae Atk., leaf spot. Ala. (1).
Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot. Va. (1).
Phyllosticta ludwigiae Pk., leaf spot. N.Y. (2); Iowa, Wis. (3).
Physalospora obtusa (Schw.) Cke., on stems. Ga., S.C. (1).
Puccinia jussiaeae Speg. (O,I,III), rust. Fla., Md. (1); Fla., La., Ohio., Tex. (2); Del. to Fla., Miss., and Wis., also Calif. (3).
Septoria ludwigiae Cke., leaf spot. Ill., Md., Miss., Pa. (1); Calif., Del., Ill., N.Y., Oreg., S.C., Wis. (2); Fla., N.Y. (3).

Oenothera, evening-primrose

(1) *O. albicaulis* Pursh (with *O. nuttallii* Sweet and *O. pallida* Lindl.)
(2) *O. biennis* L., common evening-primrose.
(3) *O. fruticosa* L. (with *O. perennis* L.), sundrops.
(4) *O. laciniata* Hill
(5) *O. ovata* Nutt., goldeneggs.
(6) *O. speciosa* Nutt., white evening-primrose.
(7) Other species.

Numerous annual or perennial herbs, widely distributed on plains and old fields throughout the United States; many are of ornamental value and widely cultivated, a few are weeds in cultivated ground, several are useful to wildlife.

Aecidium anograe Arth. (O,I), rust. Nebr. (1).
Alternaria tenuis Auct., leaf spot (?secondary). N.J. (7).
Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska (7).
Cercospora oenotherae Ell. & Ev., leaf spot. Kans. (1); Ala., W.Va. (2); Tex. (6).
C. oenotherae-sinuatae Atk. Ala. (4), N.C. (7).
C. didymospora Ell. & Barth., on leaves and seed pods. Oreg. (1), Kans. (2,7).
Cuscuta arvensis Beyrich, dodder. Okla. (7).
Diaporthe arctii (Lasch) Nits., on stems. Ga. (2).
Erysiphe polygoni DC., powdery mildew. General (2); occasional on (1), (3), (4), and (7) throughout their range.
Leptosphaeria ellisiana Berl., on dead stems. N.Dak., N.J. (7).
Macrophoma oenotherae-biennis Dearn., on stems and seed pods. N.Y. (2).
Mycosphaerella sp. (*Sphaerella oenotherae* Ell. & Ev.,) on stems and seed pods. N.J. (2).
Peronospora arthuri Farl., downy mildew. Mass. to Miss., Nebr., and S.Dak. (2); Kans., Okla. (4); Mont., N.Dak. (7).
Pestalotia oenotherae Ell. & Barth., leaf spot. Ohio (2), Okla. (7).
Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot. Md., Ga., N.C., Va. (2); S.Dak. (7).
Phomopsis oenotherae (Dearn.) Petr., on seed pods. N.Y. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4,7).
Physalospora obtusa (Schw.) Cke., on stems. W.Va. (2); Ga. (4).
P. rhodina (Berk. & Curt.) Cke.—N.J. (2).
Puccinia aristidae Tracy (O,I), rust. Ariz., Nev. (7). II and III on *Aristida* and *Distichlis*.
P. extensicola Plowr. var. *oenotherae* (Mont.) Arth. (O,I). Maine to Ala., Colo., and N.Dak. (2,3,4); also within this range and to Tex. and Calif. (7). II and III on *Carex* spp.
P. oenotherae Vize (O,I,II,III). Mont. to Calif. and Wash. (7).
P. oenotherae var. *heterantha* (Ell. & Ev.) Arth. Calif. (5); Mont. to Colo., Calif., and Idaho (7).
Rhizoctonia solani Kuehn, root rot. Tex. (4).
Septoria oenotherae West., leaf spot. N.Dak. (1); Maine to Fla., Okla., and S.Dak. (2,3,4); Calif. (5); and to N.Mex. and Utah (7).
Synchytrium fulgens Schroet., leaf gall. Iowa, Kans., N.Y. (2); Miss. (3); Ala., La., Miss., N.C., Okla., Tex. (4); also to Calif. and Iowa (7).
Uromyces plumbarius (O,I,II,III), rust. General (2,4); Calif. (5); also on other species, mostly in the Western States, occasional in the East.
Mosaic—unidentified virus. Pa. (7).

Zauschneria

(1) *Z. californica* Presl, California fuchsia, fire-chalice.
(2) *Z. garrettii* A.Nels.

Perennial herbs of California to Arizona and Utah, the flowers brilliant and fuchsia-like; grown for ornament.

Puccinia oenotherae Vize (O,I,II,III), rust. Calif. (1), Utah (2).

ORCHIDACEAE [8]

Orchids

I. Exotic Genera and Species

(1) *Cattleya*
(2) *Cymbidium*
(3) *Dendrobium*
(4) *Epidendrum*
(5) *Laelia*
(6) *Odontoglossum*
(7) *Oncidium*
(8) *Phalaenopsis*
(9) Miscellaneous species.

Perennial herbaceous plants, cultivated under glass commercially for cut flowers, grown in fanciers' collections for the showy bloom, and endemic in tropical America.

Botrytis cinerea Pers. ex Fr., gray mold, flower spot. Occasional in greenhouse culture.
Cercospora spp., leaf spot. *C. angreci* Feull. ex Roum. and *C. odontoglossi* Prill. & Del., on imported plants (5,6,7).
Chaetodiplodia sp., leaf spot. On imported plants (1).
Colletotrichum spp., anthracnose (leaf and stem spot, stem rot) or secondary on moribund parts. General on cultivated orchids, also on collected plants especially in commercial handling. Commonly reported species are *C. orchidearum* Allesch. (?saprophytic)

[8] Because of the numerous genera in this family and the relatively few fungi and other organisms reported as parasitic on them in the U. S., the hosts are divided into two main groups, as shown, each containing a number of genera. The genus *Vanilla*, of special economic interest, is listed separately.

and *C. cinctum* (Berk. & Curt.) Ston., sometimes also *C. gloeosporioides* Penz. The latter two, also reported as *Glomerella cincta* (Ston.) Spauld. & Schrenk and *G. cingulata* (Ston.) Spauld. & Schrenk, respectively, are probably at least capable of wound parasitism. Intergrades with *Gloeosporium* commonly occur, and numerous specific names have been applied to what are probably only variant forms of these species on different hosts; their identities and pathological effects not sufficiently known to warrant present discrimination. SEE ALSO *Gloeosporium*, *Glomerella*, *Physalospora*, and *Volutella*.

Diplodia spp., on old leaves and stems. *D. paraphysaria* Sacc. reported in Md., Mo., and on imported plants (1); *D. natalensis* P.Evans on imported plants (1).

Erwinia carotovora (L.R.Jones) Holland, soft rot. N.J. (1).

Gloeosporium spp., anthracnose, secondary leaf spot. *G. affine* Sacc., on imported plants (1,3,4,5,8,9). *G. cattleyae* P.Henn. reported in Va., P.R., and on imported plants (1); also other names as *G. dendrobii* Maubl. (3), *G. epidendri* P.Henn. (4), and *G. laeliae* P.Henn. (5) on imported plants, but identity doubtful. For *G. cinctum* Berk. & Curt., see *Colletotrichum*.

Glomerella cincta (Ston.) Spauld. & Schrenk and *G. cingulata* (Ston.) Spauld. & Schrenk, ascigerous stages, respectively, of *Colletotrichum cinctum* and *C. gloeosporioides*, and doubtfully distinguishable; sometimes mentioned in reports but usually in reference to the conidial stage.

Hendersonia epidendri Keissl., on leaves. V.I. (4).

Macrophoma cattleyicola P.Henn., leaf spot. T.H. (1).

M. oncidii P.Henn., leaf spot or present on old stems and leaves. C.Z. (7); also on imported plants (1,3,5,7,8).

Meliola sp., black mildew. P.R. (9).

Morenoella calami Rac., black mildew. P.R. (4).

Nectria bulbicola P.Henn. (?*N. ochroleuca* (Schw.) Berk.), dry rot or ?saprophytic on imported plants (8).

Phyllosticta spp., leaf spot. N.J. (9), Pa. (5,9). *P. laeliae* Keissl. (5), *P. nigromaculans* Sacc. (7), on imported plants.

Physalospora spp., spotting or decay of leaves and stems of imported plants. *P. camptospora* Sacc. (9), *P. cattleyae* Maub. & Lasnier (1), *P. orchidearum* P.Henn. (1,3,4,7,8).

Pratylenchus pratensis (De Man) Filip., root nematode. Md. (1).

Pythium splendens Braun, leaf rot. ?N.Y. (1).

Rhizoctonia solani Kuehn, root rot. Okla. (4). Various *Rhizoctonia* spp. in so-called mycorrhizal associations have been isolated from roots of native orchids and doubtlessly occur in cultivated ones, but no specific reports of the latter are at hand.

Sclerotium rolfsii Sacc., stem rot. On imported plants. (1).

Selenophoma sp., leaf spot. N.J., N.Y. (3); imported plants (2,3,5,6,7).

Uredo behnickiana P.Henn. (II), rust. N.J. (1,4), N.Y. (1), C.Z. (7), imported plants (1,4,7).

U. epidendri P.Henn. (II). On imported plants (4).

U. guacae Mayor (II). Fla., P.R. (4).

U. nigropuncta P.Henn. (II). Fla. (4,9), P.R. (9), also on imported plants (1,6).

?*U. oncidii* P.Henn. (II). T.H., also on imported plants (7).

Volutella albido-pila Boud., leaf spot. On imported plants (8).

MOSAIC—suspected virus but not confirmed. Calif., Ill., N.J., N.Y., Ohio (2).

II. Native Genera

(1) *Aplectrum*, puttyroot, Adam-and-Eve.
(2) *Calopogon*, grass-pink, swamp-pink.
(3) *Cypripedium*, ladyslipper, moccasinflower.
(4) *Goodyera*, rattlesnake-plantain.
(5) *Habenaria*, fringe-orchid.
(6) *Pogonia*, beardflower.
(7) *Spiranthes*, ladies-tresses, pearl-twist.
(8) Others.

Perennial herbs of woodlands, bogs, and meadows; sometimes grown in wild gardens.

Aecidium graebnerianum P.Henn. (I), rust. Calif., Mont., Oreg., Wash., Alaska (5).

Cercospora cypripedii Ell. & Dearn., leaf spot. N.Y., Wis. (3).

Fusicladium aplectri Ell. & Ev., leaf spot. Del. (1).

Leptosphaeria corallorhizae Pk., on stems. N.Y. (8).

Mycosphaerella cypripedii (Pk.), Lindau, leaf spot. N.Y. (3).

Phoma corallorhizae Ell. & Ev., on stems. N.Y. (8).

Phyllosticta aplectri Ell. & Ev., leaf spot. Del. (1).

Puccinia cypripedii Arth. & Holw. (II,III), rust. Ind., N.J. (2); Iowa, Mich., Va., Wis. (3). O and I unknown.

Pucciniastrum goodyerae (Tranz.) Arth. (II,III), rust. Calif., Colo., N.Mex., Oreg., Wash. (4).

Rhizoctonia spp., in roots, mycorrhiza. The following special forms have been reported on various hosts as listed: *R. borealis* J.T.Curtis (4,7); *R. gracilis* Burgeff (5); *R. lanuginosa* G.Bernard (2,4); *R. monilioides* J.T.Curtis (5,6,7,8); *R. neottiae* Wolf (1); *R. repens* G.Bernard (2,4,5,6,7,8); *R. robusta* Burgeff (3,5); *R. sclerotica* Burgeff (3,5,7); *R. stahlii* Burgeff (5,7); *R. subtilis* Burgeff (3,5); *R. subtilis* var. *nigra* J.T. Curtis (7); all in Wis. except *R. repens* also reported in N.H. (7), but probably widespread. The symbiotic relationships and host specificity formerly claimed have not been substantiated, and these fungi may be regarded as saprophytic or weakly parasitic, having no special function in seed germination and not restricted to particular hosts. However, this is opposed by evidence that *R. mucoroides* G.Bernard, isolated from *Zeuxine strateumatica* (L.) Schltr. in Fla., has an essential role in seed germination.

Septoria calypsonis Povah, leaf spot. Mich. (2).

Uredo gynandrearum Cda. (II), rust. P.R. (5).

Vanilla

V. planifolia Andr. (*V. fragrans* (Salisb.) Ames), common vanilla.

Perennial herbaceous vine of tropical America, cultivated for ornament and for the seed pods from which a flavoring extract, the vanilla of commerce, is obtained.

Botryosphaeria vanillae (Ston.) Petch & Ragunathan, leaf and pod spot. Fla. Tropical America.

Cephaleuros virescens Kunze, green scurf. P.R.

Fusarium oxysporum Schlecht. f. *vanillae* Tucker, root rot, wilt. P.R.

F. solani (Mart.) Appel & Wr., root rot (?secondary). P.R.

Gloeosporium vanillae Cke.: SEE *Volutella vanillae*.

Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf and pod spot. P.R., T.H.

Lembosia rolfsii Horne, black mildew. Fla.

Pellicularia koleroga Cke., thread blight. P.R.

Sclerotium rolfsii Sacc., stem rot. P.R.

Volutella vanillae (Del.) Petch & Ragunathan, leaf

and pod spot. Fla. Based on *Vermicularia vanillae* Del. but the earlier *Gloeosporium vanillae* Cke. may be the same; said to be the conidial stage of *Botryosphaeria vanillae*.

OSMUNDACEAE

Osmunda

(1) *O. cinnamomea* L., cinnamonfern.
(2) *O. claytoniana* L., interrupted fern.
(3) *O. regalis* L., royalfern.

Tall, somewhat coarse but attractive, ferns of damp woods and bogs of the Eastern and Central States and southward; (3) also in tropical America; used in wild gardens.

Dothidella osmundae (Peck & G.W.Clint.) Sacc., on dead leafstalks. N.Y. (3). Also referred to *Phyllachora;* perhaps misplaced in both genera.
Gloeosporium osmundae Ell. & Ev., leaf spot. Mich. (1).
Leptostroma filicinum Fr. (=*Rhopographus filicinus* (Fr.) Fckl.), on dead leafstalks. Maine, Pa. (1); probably general.
Leptostromella filicina (Berk. & Curt.) Sacc., on dead leafstalks. Miss., Ohio, Pa., Tenn., Va. (1); N.Y. (3); probably general.
Leptothyrium litigiosum (Desm.) Sacc. (=*Microthyrium litigiosum* Sacc.), on dead leafstalks. Ga., S.C. (1).
Mykosyrinx osmundae Pk., inflorescence smut. N.Y. (1,3); Mich., Wis. (3).
Taphrina higginsii Mix, leaf blister. Ga. (1).
Typhula filicina Pk., on dead leafstalks. N.Y., Va. (1).
Uredinopsis osmundae Magn. (II,III), rust. Northeastern and Great Lakes States (1,2,3); also to Fla. and Ala. (1,3). O and I on *Abies balsamea* (L.) Mill.

OXALIDACEAE

Oxalis, woodsorrel, ladys-sorrel

(1) *O. acetosella* L.
(2) *O. corniculata* L., creeping woodsorrel.
(3) *O. stricta* L.
(4) *O. violacea* L., violet woodsorrel.
(5) Other species.

Numerous, tufted or creeping perennial herbs, sometimes bulbous or with tuberous roots, native and introduced; some of the latter are grown for ornament, others are troublesome garden and lawn weeds; several are useful to wildlife. Records listed below pertain mostly to the introduced but widely naturalized species (2) and (3) and to the native species (4).

Aecidium oxalidis Thuem.: SEE *Puccinia sorghi*.
Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska (5).
Cercospora oxalidiphila Chupp & Muller, leaf spot. Wis. (3).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. ?Fla. (2), T.H. (5).
Microsphaera russellii G.W.Clint., powdery mildew. Maine to W. Va., Kans., and Minn. (2,3); Wash. (3); Ohio (5).
Phyllachora oxalina Ell. & Ev., tar spot. Del. (2); Maine, Vt. (3).
Phyllosticta guttulatae Halst., leaf spot. Vt. to N.J., Ind., and Wis. (2,3).
P. oxalidis Sacc. Tex. (2,3,5), Wis. (3).
Pratylenchus pratensis (De Man) Filip., root nematode. T.H. (5).
Puccinia andropogonis Schw. var. *oxalidis* Arth. (O,I), rust. Okla., Tex. (2). II and III on *Andropogon* spp.
P. oxalidis (Lév.) Diet. & Ell. (II,III). La., Miss., N. Mex., Tex. (4); Fla., Ga., S.C., Tenn., Tex., P.R. (5). O and I on *Mahonia repens* Don.
P. sorghi Schw. (O,I). Ind., Iowa, Kans., Mich., N. Dak., S. Dak., Tex. (2,3); Iowa, Kans., Miss., Nebr. (4); Okla., Tex. (5). II and III on *Zea mays* L. and *Euchlaena mexicana* Schrad.
Ramularia oxalidis Farl., leaf spot. N.H., Pa., Tenn. (1); Vt. (1,2); Nebr., N.H., N.Mex. (4); Oreg. (5).
Septoria acetosella Dearn. & House, leaf spot. N.Y. (1).
S. oxalidis Lind. Oreg. (5).
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Conn. (3).
Ustilago oxalidis Ell. & Tracy, seed smut. Mo., Pa., Tex., W. Va. (2); Conn. to Miss., Tex., and Wis. (3); Ohio, Tex. (5).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Tex. (2,3,4).

PALMACEAE

Arecastrum

A. romanzoffianum (Cham.) Becc. (*Cocos plumosa* Hook.), queen palm, plumy-coconut, including the var. *australe* (Mart.) Becc. (*C. flexuosa* Hort.). A *Cocos* segregate: SEE ALSO *Cocos*.

Erect, single-trunked palm tree, endemic in South American, cultivated in southern California and Florida and in greenhouses; an avenue and lawn tree.

Dothiorella gregaria Sacc. (*?Botryosphaeria ribis* Gross. & Dug.), gummosis, canker. Calif.
Exosporium palmivorum Sacc., leaf spot. Fla.
Glomerella cincta (Ston.) Spauld. & Schrenk, leaf spot. N.J.
Graphiola phoenicis (Moug.) Poit., false smut, leaf spot. Fla.
Penicillium vermoeseni Biourge, canker. Calif.
Pestalotia palmarum Cke., on leaves. Fla.
Phyllosticta sp., on leaves. Fla.
Phytophthora palmivora Butl., bud rot, wilt. Fla.
Pythium sp., wilt. Fla.
Septoria cocoina Ell. & Ev., leaf spot. Mo.
FRIZZLE-LEAF CHLOROSIS—manganese deficiency. Fla.

Arenga

A. pinnata (Wurmb.) Merr. (*A. saccharifera* Labill.), sugar palm.

Tall tree of tropical Asia, also cultivated as an ornamental under glass.

Graphiola phoenicis (Moug.) Poit., false smut. Occasional.

Caryota

Caryota spp., fishtail palms.

Trees with tall trunks, leaves fan-shaped and drooping in a graceful spray; cultivated under glass and in southern Florida.

Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf and stem blight.

Cocos

C. nucifera L., coconut.

A somewhat inclined tree with a single trunk, grown along seacoasts of tropical America reaching to southern Florida; the palm tree of commerce. Products of the nut include a drinkable milklike liquid, copra, and coir.

Aphelenchoides cocophilus (Cobb) Goodey, red ring disease. C.Z., P.R.

Cephalosporium lecanii Zimm., parasitic on scale insects. P.R.

Ceratostomella paradoxa Dade: See *Endoconidiophora paradoxa.*

Diplodia epicocos Cke. (*Sphaeropsis palmarum* Cke.), associated with leaf spot, leaf-break, and dieback, but probably secondary. West Indies.

Endocalyx melanoxthanus (Berk. & Br.) Petch (*Melanconium melanoxthanum* Berk. & Br.), on petioles, ?leaf-break. T.H.

Endoconidiophora paradoxa (Dade) Davidson (*Thielaviopsis paradoxa* (De Seyn.) Hoehn.) leaf-bitten disease, leaf scorch, stem-bleeding. Fla., West Indies.

Gloeosporium sp., on leaves. Fla.

Pellicularia koleroga Cke., thread blight. Fla.

Pestalotia palmarum Cke., gray leaf spot, leaf-break (probably secondary). C.Z., Fla., West Indies.

Phomopsis cocoes Petch, on nuts. P.R.

Phyllosticta sp., on leaves. Fla.

Physalospora fusca N.E.Stevens, on leaves. Fla.

P. rhodina (Berk. & Curt.) Cke., on roots and trunk. Fla.

Phytophthora palmivora Butl. (*P. faberi* Maubl.), bud rot, leaf drop, wilt. Fla., West Indies.

Pythium sp., wilt. Fla.

Sphaeropsis palmarum Cke.: See *Diplodia epicocos.*

Thielaviopsis paradoxa (De Seyn.) Hoehn.): See *Endoconidiophora paradoxa.*

Bud rot—chiefly fungal (see *Phytophthora*) but, in part, possibly bacterial following environmental and mechanical injuries. West Indies.

Dieback, leaf-break — physiogenic, probably from drought and root rot. West Indies.

Yellow leaf, tapering stem wilt—physiogenic, ?malnutrition. West Indies.

Wilt, ?bronze leaf wilt — physiogenic, probably drought. West Indies.

Elaeis

Elaeis spp. and vars.

Species and varieties of feather palms of tropical America and Africa; the species *E. guineensis* Jacq., African oilpalm, sometimes grown as an ornamental in southern Florida and the West Indies; grown for oil in the Eastern Hemisphere.

Achorella attaleae F.L.Stevens, leaf spot. C.Z.

Meliola elaeis F.L.Stevens—C.Z.

M. melanococcae F.L.Stevens, black mildew. C.Z.

Phoenix

(1) *P. canariensis* Chabaud., Canary date palm.

Tall tree, native of the Canary Islands, frequently grown as a lawn tree in southern United States and as a pot plant under glass.

(2) *P. dactylifera* L., date palm.

Strong, tall tree, native of the Mediterranean region; commercially cultivated for its edible fruit in Arizona and California and for ornament in southern United States and tropical America.

Alternaria sp., leaf spot. Fla. (1); Ariz., Calif., Tex. (2).

A. citri Ell. & Pierce, brown spot of fruit. Ariz., Calif., Tex. (2).

A. stemphylioides Bliss, fruit spoilage. Calif. (2).

Armillaria mellea Vahl ex Fr., root rot. Calif. (1).

Aspergillus niger v. Tiegh., calyx-end rot. Calif., Wash. (2).

Auerswaldia palmicola Speg., on leaves. P.R. (2).

Catenularia fuliginea Saito, fruit rot. Ariz., Calif. (2).

Ceratostomella radicicola Bliss, root rot. Calif. (2).

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1).

Colletotrichum gloeosporioides Penz., on leaves. Tex. (2).

Diplodia phoenicum (Sacc.) Fawc. & Klotz (*?D. natalensis* P.Evans), leafstalk rot, shoot blight, fruit rot. Ariz., Calif. (2).

Endoconidiophora paradoxa (Dade) Davidson (*Thielaviopsis paradoxa* (De Seyn.) Hoehn., black scorch, heart bud rot. Ariz., Calif. (2).

Exosporium palmivorum Sacc., leaf spot. Fla., La., Tex. (1); Gulf States (2).

Fusarium spp. (*F. moniliforme* Sheldon and *F. semitectum* Berk. & Rav., *?F. lateritium* Nees), inflorescence blight, fruit rot. Ariz. (2).

Graphiola phoenicis (Moug.) Poit., leaf spot, false smut. Widespread (1,2), Tex. (2).

Helminthosporium molle Berk. & Curt., brown spot of fruit. Ariz., Calif. (2).

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

Macrophoma phoenicum Sacc.: See *Diplodia phoenicum.*

Meliola furcata Lév., black mildew. P.R. (2).

Meloidogyne spp., root knot nematodes. Ariz. (1), Calif. (2).

Omphalia pigmentata Bliss and *O. tralucida* Bliss, decline disease. Calif. (2).

Penicillium roseum Lk., fruit rot. Ariz., Calif. (2).

P. vermoeseni Biourge, canker. Calif. (1).

Pestalotia sp., leaf spot. Calif., Tex. (2).

P. palmarum Cke., leaf spot. Fla. (1).

Phomopsis phoenicola Trav., fruit rot. Calif. (2).

Phymatotrichum omnivorum (Shear) Dug., on roots, doubtfully pathogenic. Ariz., Calif. (2).

Physalospora rhodina (Berk. & Curt.) Cke., on fronds. Fla. (1).

Pleospora herbarum (Pers.) Rab., fruit rot, mold. Calif. (2).

Poria spp., wood rot. Ariz., Calif. (2). Species reported include: *P. ambigua* Bres., *P. ravenelae* (Berk. & Br.) Sacc., *P. versipora* (Pers.) Romell.
Thielaviopsis paradoxa (De Seyn.) Hoehn.): See *Endoconidiophora paradoxa.*
Black nose—severe stage of fruit checking or fruit cracking caused by rain or high humidity during early stages of ripening. Calif. (2).
Chlorosis—manganese deficiency. Fla. (1).
Rhizosis—root necrosis, in part, but not invariably, associated with *Ceratostomella radicicola* Bliss—Calif. (2).

Roystonea

Roystonea spp., especially *R. elata* (Bartr.) F.Harper (*R. regia* (H.B.K.) O.F. Cook; *R. floridana* O.F.Cook), Cuban royal palm, and *R. borinquena* O.F.Cook, Puerto Rico royal palm.

Tall columnar feather palms of tropical America: *R. elata* planted for ornament and as a tree in southern Florida; *R. borinquena* used for construction of furniture and grown for ornament in Puerto Rico. Juvenile forms are grown as conservatory plants.

Alternaria sp., leaf spot. Fla.
Colletotrichum gloeosporioides Penz., anthracnose, petiole spot. Fla., Tex.
Diplodia sp., leaf spot. Fla.
Epicoccum neglectum Desm., leaf spot. Fla.
Graphiola phoenicis (Moug.) Poit., false smut. Fla.
Helminthosporium sp., leaf stripe. Fla.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Melanconium sabal Cke., on leafstalks. Fla.
Meliola denticulata Wint., black mildew. P.R.
Meloidogyne sp., root knot nematodes. Fla.
Nectria cinnabarina Tode ex Fr., on bark. Fla.
Ophiobolus versisporus Ell. & G.Martin, on leafstalks. Fla.
Pestalotia palmarum Cke., leaf spot. P.R.
Phytophthora palmivora Butl., wilt. Fla.
Little leaf—cause unknown. Fla.

Sabal, palmetto

Sabal spp., especially *S. causiarum* (Cook) Becc., Puerto Rico hat palm; *S. palmetto* (Walt.) Lodd., cabbage, or common, palmetto, and several closely related species such as *S. louisiana* (Darby) Bomhard, *S. minor* (Jacq.) Pers., dwarf, or bush, palmetto, and *S. texana* Becc.

Tall trees of the West Indies (*S. causiarum*) and of the southeastern Atlantic coast from North Carolina to Florida (*S. palmetto*); related palmetto species grown for ornament in the Gulf States and California.

Amerosporium sabalinum Ell. & Ev., on dead leaves. La.
Anthostomella spp., on dead leafstalks and blades. Ga. to Fla. and La. Species reported include: *A. leucobasis* (Ell. & G.Martin) Sacc., *A. melanosticta* Ell. & Ev., *A. minor* Ell. & Ev., and *A. sabalensioides* (Ell. & G.Martin) Sacc.
Asterina sabalicola Earle, on living leaves. Fla., Ga.
Catacauma sabal Chardon, black spot. On *S. etonia* Swingle, *S. minor*, and *S. palmetto* in Fla., Ga.; on *S. texana* in Tex.
Cenangium sabalidis (Ell. & G.Martin) Sacc., on leafstalks. Fla.
Cocconia sparsa (Pk. & Cke.) Sacc., on leafstalks. Fla.
Ellisiodothis inquinans (Ell. & Ev.) Th., on dead leaves. Fla., La., Miss.
Ganoderma sulcatum Murr., on dead trunks. Fla., Ga.
Gnomonia sabalicola Earle, on leafstalks. Ala.
Graphiola spp., false smut: *G. congesta* Berk. & Rav.—Ala., Fla., S.C.; *G. phoenicis* (Moug.) Poit.—Fla., Miss., P.R.; *G. thaxteri* E.Fisch.—Fla.
Helminthosporium spiculiferum Ell. & Ev., leaf spot. La., Miss.
Hendersonia sabaleos Ces., on leaves. Miss.
Leptostroma micropunctum Cke., on leaves. S.C.
Linospora palmetto Ell. & Ev., on leaves. La.
Melanconium palmarum Cke., on leafstalks. Fla., Ga.
Meliola amphitricha Fr.—Miss.
M. bidentata Cke.—Fla.
M. furcata Lév.—Fla.
M. palmicola Wint., black mildew. Gulf States, C.Z., P.R., T.H.
M. sabalidis Sacc.—Fla.
Metasphaeria palmetta (Cke.) Sacc., on leafstalks. Ga.
Mycosphaerella serrulata (Ell. & Ev.) Diehl, leaf spot. Fla., S.C.
Myrianginella sabaleos (Weedon) Limber & Jenkins, black speck. On *S. etonia, S. minor*, and *S. palmetto* in Fla. and Ga.
Ophiobolus versisporus Ell. & G.Martin, on leafstalks. Fla.
Pestalotia palmarum Cke., on leaves. Fla.
Phyllosticta palmetto Ell. & Ev., leaf spot. La., Miss.
Phytophthora palmivora Butl., bud rot. P.R.
Polyporus tulipiferus (Schw.) Overh., on dead trunks. Fla.
Poria cocos Wolf, on roots. Fla.
P. heteromorpha Murr., on leafstalks. Fla.
Rhabdospora sabalensis Cke., on leafstalks. La., S.C.
Schizophyllum commune Fr., on dead trunks. S.C.
Septobasidium sabalis Couch, fungus felt. La.
S. sabal-minor Couch—Fla.
Septoria sp.—On *S. minor* in Ga.
Sphaeropsis sabalicola Ell. & Carver, on leafstalks. Ala.
Trametes cubensis (Mont.) Sacc., on dead trunks. Fla.
Valsa sabalina Cke., on leafstalks. Ala., Fla., Ga.
Venturia sabalicola Ell. & Ev., on dead leaves. La.

Washingtonia, Washington palms

Washingtonia spp.: *W. filifera* (Linden) Wendl., California Washington palm, and *W. robusta* Wendl., Mexican Washington palm.

Tall fan-palms, indigenous to southern California and Mexico, grown for ornament and shade chiefly in California and Florida.

Auerswaldia sp., leaf spot. Calif.
Cercospora sp., leaf spot. Fla.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Colletotrichum sp., leaf spot. Fla.
Cylindrocladium macrosporium Sherb., leaf spot. Fla.
Euryachora neowashingtonianae Dearn., on leafstalks. Fla.
Graphiola phoenicis (Moug.) Poit., false smut. Fla., Tex.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Ariz., Fla.
Metasphaeria washingtoniae Earle, on dead leaves. Calif.
Mycosphaerella washingtoniae Rehm, on leaves. Calif.
Omphalia pigmentata Bliss and *O. tralucida* Bliss, on

decaying leaf bases. Calif. Both species have been shown to be pathogenic to roots of seedlings but have not been reported as naturally infecting this host.
Pencillium vermoeseni Biourge, bud rot. Calif. (on *W. filifera*). *W. robusta* is resistant.
Pestalotia palmarum Cke., leaf spot. Fla.
Phaeochora neowashingtoniae (Shear) Th. & Syd., on leafstalks. Calif.
Phoma palmicola Wint., on leaves, ?leaf spot. Tex.
Phomopsis sp., on leaves. Tex.
P. pritchardiae (Cke. & Harkn.) Sacc.—Calif.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Phytophthora sp., bud rot. Ariz.
Pseudomonas washingtoniae (Pine) Elliott, bacterial leaf spot. Ariz.
Pythium sp., wilt. Fla.
Sphaerodothis neowashingtoniae Shear, on leaves. Calif.

Palm genera of minor economic importance

Listed below are records on the minor genera and those whose names may be unfamiliar through recent nomenclatorial changes. The genera so treated include: *Attalea, Chamaerops, Coccothrinax, Livistona, Pritchardia, Serenoa, Thrinax,* and various others.

Achorella attaleae F.L.Stevens, leaf spot. C.Z. (on *Attalea*).
Catacauma palmicola F.L.Stevens, black leaf spot. P.R., V.I. (on *Thrinax*).
Colletotrichum gloeosporioides Penz., leaf blight. Cosmopolitan. Conidial stage of *Glomerella cingulata.*
Cytospora palmarum Cke.—Fla.
Didymella phacidiomorpha (Ces.) Sacc., on leaves. Fla. (on *Coccothrinax*).
Diplodia theobromae (Pat.) Nowell (*D. cacaoicola* P. Henn.), dieback, leaf spot. General in Tropics.
Exosporium palmivorum Sacc., leaf spot. Ohio, N.Y., Tex.
Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf spot, canker. Cosmopolitan.
Graphiola phoenicis (Moug.) Poit., false smut. Widespread (on various palms).
Helminthosporium spiculiferum Ell. & Ev., on leaves. P.R. (on *Thrinax*).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meliola furcata Lév., black mildew. P.R. (on *Chamaerops* and *Thrinax*).
M. palmicola Wint. — C.Z., T.H. (on *Serenoa* and *Thrinax*).
Meloidogyne spp., root knot nematodes. Occasional (on various palms).
Mycosphaerella palmae Miles, on leaves. P.R.
Pestalotia sp. and *P. palmarum* Cke., on leaves. Widespread (on various palms).
Phoma maculata (Cke. & Harkn.) Sacc., on leaves. Calif.
Phomopsis spp. (*P. arecae* Syd. and *P. palmicola* (Wint.) Sacc.), dieback and leaf spot. Md., N.J. (on *Livistona*).
P. pritchardiae (Cke. & Harkn.) Sacc., on leaves. Calif. (on *Pritchardia*).
Phyllosticta sp., leaf spot. Fla. (on various palms).
Phytophthora palmivora Butl., wilt. Fla.
Polyporus nivosellus (Murr.) Stevenson, wood rot. P.R.
Thielaviopsis paradoxa (De Seyn.) Hoehn., root rot. Fla. Conidial stage of *Endoconidiophora paradoxa* (Dade) Davidson.

PANDANACEAE

Pandanus, screwpine

Pandanus spp., especially *P. utilis* Bory and *P. veitchii* Dall.

Tropical trees or shrubs; *P. utilis* cultivated for its edible fruit and for fiber; both are commonly grown in juvenile stages as conservatory and house plants.

Botryosphaeria ribis Gross. & Dug. var. *chromogena* Shear, N. E. Stevens, & M. S. Wilcox, on stems. T.H.
Colletotrichum gloeosporioides Penz. (*C. omnivorum* Hals.), on leaves. Cosmopolitan.
Diplodia theobromae (Pa.) Nowell (*D. natalensis* P. Evans), on leaves. Widespread in Tropics.
Heterosporium iridis (Fautr. & Roum.) Jacques, leaf spot. Iowa.
Macrophoma pandani (Lév.) Berl. & Vogl., leaf spot. Calif., Fla.
Melanconium pandani Lév., leaf spot. Fla., Md., T.H.
Pestalotia palmarum Cke., on leaves. Fla.
Phomopsis sp., leaf spot. N.J.
Phyllosticta pandanicola Young, leaf spot. P.R.
Physalospora pandani Ell. & Ev., on leaves. Tenn.
Schizochora pandani F. L. Stevens, on leaves. T.H.
Trametes corrugata (Pers.) Bres., wood rot. T.H.
Volutella mellea Clark, on leaves. N.Y.

PAPAVERACEAE

Argemone, pricklepoppy

(1) *A. mexicana* L., Mexican pricklepoppy.
(2) *A. platyceras* Link & Otto, crested pricklepoppy.

Perennial, prickly herbs of tropical America and southwestern United States; adventive north and east and escaped from gardens where grown for ornament.

Aecidium plenum Arth. (O,I), rust. Tex. (3).
Alternaria lancipes Ell. & Ev., leaf spot. Tex. (1,2,3); Kans. (2).
Cercospora whetzelii Chupp, leaf spot. P.R. (1).
Cladosporium guanicensis F. L. Stevens, leaf mold. P.R. (1).
Gloeosporium argemonis Ell. & Ev., leaf spot. Tex. (1,2,3); Kans. (2).
Peronospora arborescens (Berk.) d By., downy mildew. Tex. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,3).
Septoria argemones Tharp, leaf spot. Okla. (1,3); Tex. (1,2,3); Nebr. (3).
S. chelidonii Desm.—P.R. (1).

Chelidonium

C. majus L., celandine

Biennial herb of Europe, naturalized in the Eastern States, sometimes grown in wild gardens.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Septoria chelidonii Desm., leaf spot. Tex.

Dendromecon

D. rigida Benth., treepoppy or bushpoppy.

Evergreen shrub of range 4 and 5, sometimes cultivated as an ornamental.

Entyloma eschscholtziae Harkn., leaf smut. Calif.
Pleosphaerulina californica Berl., on branches. Calif.
Pocosphaeria dendromeconis Earle, on branches. Calif.

Eschscholtzia

E. californica Cham., California-poppy, including numerous forms distinguished as races and varieties or sometimes species.

Annual, or sometimes perennial, showy-flowered herb of sandy plains in California and Arizona; selected forms are widely grown for ornament.

Alternaria sp., collar rot. Tex.
Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska.
Entyloma eschscholtziae Harkn., leaf smut. Calif.
Erysiphe polygoni DC., powdery mildew. Calif.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Heterosporium eschscholtziae Harkn., leaf mold. Calif.
Meloidogyne sp., root knot nematodes. Tex.
Verticillium albo-atrum Reinke & Berth., wilt. Calif.
Xanthomonas papavericola (Bryan & McWhorter) Dows., bacterial blight. Tex.
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.J., N.Y. Also var. *californicus* Holmes, *Callistephus* virus 1A K.M.Sm., in Calif.

Papaver, poppy

(1) *P. nudicaule* L., Iceland poppy.
(2) *P. orientale* L., oriental poppy.
(3) *P. rhoeas* L., corn poppy.
(4) *P. somniferum* L., opium poppy.
(5) Other species.

Perennial (1,2) or annual (3,4) herbs, mostly of the Mediterranean region and southern Asia, except (1) of northern Eurasia and in arctic and alpine North America; widely cultivated for ornament (1,2,3) and for oil and as a source of opium (morphine the principal alkaloid) (4).

Aphelenchoides fragariae (Ritz.-Bos) Christie, leaf nematodes. ?N.J. (2).
Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska (1,3); Md., Wis. (2).
Cercospora papaveri Muller & Chupp, leaf and seed-pod spot. Ala., ?Fla., Tex.
Entyloma fuscum Schroet., leaf smut. Iowa, Maine (1); Tex. (5).
Erysiphe polygoni DC., powdery mildew. Oreg. (4).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.
Pleospora media Niessl., on stems. Alaska (1). *?P. pellita* (Fr.) Rob., usually on *Papaver.*
Rhizoctonia solani Kuehn, root and stem rot, damping-off. Maine, N.Y. (1); Ind., N.J. (2); Kans., N.J. (3); Idaho (4).
Septoria sp., leaf spot. Iowa (5).
Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (2,5).
Xanthomonas papavericola (Bryan & McWhorter) Dows., bacterial blight. Ariz. (2); Conn., Mass., Mo., N.J., N.Y., Ohio, Va. (2,3); Md. (4); Oreg. (5).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Tex. (1,2).
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (1).

Sanguinaria

S. canadensis L., bloodroot.

Perennial herb of woodlands in the Eastern and Central States and southward, sometimes grown in wild gardens.

Botrytis sp., gray-mold blight. N.Y.
Cercospora sanguinariae Pk., leaf spot. Md., Mo., N.Y., Pa., Tex., Wis.
Cylindrosporium circinans Wint., leaf spot. Md., Mo., Wis.
Gloeosporium sanguinariae Ell. & Ev., leaf spot. Ohio, Tex.
Phyllosticta sanguinariae Wint., leaf spot. Mo., Tex., W. Va.
Pythium paroecandrum Drechs., root necrosis. Va.

PASSIFLORACEAE

Passiflora, passionflower

I. Edible Species

Passiflora spp., chiefly *P. edulis* Sims, purple granadilla, *P. laurifolia* L., waterlemon, yellow granadilla, *P. ligularis* Juss., sweet granadilla, and *P. quadrangularis* L., giant granadilla.

Tropical American vines, grown in the tropics generally and occasionally in southern Florida and southern California for edible fruit.

Botrytis sp.—T.H.
Colletotrichum gloeosporioides Penz. (also reported as *Gloeosporium* sp.), stem and leaf spot. Fla.; seedling blight. P.R.
C. passiflorae Stevens & Young, on leaves and fruit. T.H.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla.
Sclerotinia sp., collar rot. Calif.
CHLOROSIS—suspected virus. P.R.

II. Ornamental Species

Passiflora spp., especially *P. caerulea* L.

Climbing vines, cultivated for ornament in tropical America and occasionally in southern United States.

Aecidium passifloricola P. Henn.: See *Puccinia scleriae.*
Asterina arnaudia Ryan and *A. megalospora* Berk. & Curt., black leaf spot. P.R.
Cercospora biformis Pk., leaf spot. Ark., Okla., P.R.
Helminthosporium stahlii F. L. Stevens, leaf spot. P.R.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Calif.
Phyllosticta sp., leaf spot. N.J.
P. superficiale F. L. Stevens, on leaves. P.R.
Puccinia scleriae (Pazschke) Arth. (O,I), rust. C.Z., P.R. II and III on *Scleria* spp.
Septoria fructigena Berk. & Curt., on fruits. P.R., S.C.
MOSAIC—unidentified virus. T.H.

III. Native Species

Passiflora spp., especially *P. incarnata* L., wild passionflower, maypop, and *P. lutea* L.

Strong perennial vines, native in the Eastern and Southern States.

Cercospora biformis Pk., leaf spot. Ark., N.C., P.R.
C. fuscovirens Sacc.—Md. to Mo. and Tex.
C. regalis Tharp—Tex.
C. truncatella Atk.—Ala., N.C., Tex.
Gloeosporium fructigenum Berk., leaf spot. La. ?Conidial stage of *Glomerella cingulata* (Ston.) Spauld. & Schrenk.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Sclerotium rolfsii Sacc., southern blight. Fla.

PEDALIACEAE

Sesamum

S. indicum L., sesame.

Tropical herb, cultivated for oil-bearing seed used in cookery and pharmacy; naturalized in the Far South; also furnishes food for wildlife.

Cercospora sesami Zimm., leaf spot. Fla., Ga., S.C., P.R.
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. Calif., Tex.
Pseudomonas sesami Malkoff, bacterial leaf spot. Kans., Tex.
P. solanacearum E.F.Sm., bacterial wilt. Ariz.
Xanthomonas solanacearum (E.F.Sm.) Dows.: SEE *Pseudomonas solanacearum.*

PHRYMACEAE

Phryma, lopseed

P. leptostachya L.

Perennial herb of woodlands in the Eastern and Central States and southward; a wildlife-food plant.

Cercosporella exilis J. J. Davis, leaf spot. Wis.
Puccinia extensicola Plowr. var. *phrymae* (Halst.) Arth. (O,I), rust. N.Y. to Nebr. and S. Dak. II and III on *Carex* spp.
Septoria leptostachyae Ell. & Kell., leaf spot. Vt. to Kans. and Minn.

PHYTOLACCACEAE

Phytolacca, pokeberry, pokeweed

(1) *P. americana* L.
(2) Other species.

Coarse perennial herbs: (1) of old fields and waste ground throughout the Eastern and South Central States; (2) of tropical America or eastern Asia; collected for edible greens; a wildlife-food plant.

Alternaria sp., leaf spot. N.Y., Tex., Wis.
Asteroma spp., on stems. N.C., Pa. Several reputed fungi described by Schweinitz under *Dothidea* (*D. crustacea, D. elegans,* and *D. inelegans*), by Saccardo under *Phyllachora,* are referred to this genus by M. A. Curtis. Their nature and significance are unknown.
Cercospora flagellaris Ell. & G. Martin, leaf spot. N.J. to Fla., Tex., and Ill. (1); P.R. (1,2).
Diaporthe arctii (Lasch) Nits. (*D. aculeata* (Schw.) Sacc.), on dead stems. N.J. to Ala. and Ky.
Dendryphium nodulosum Sacc. (=*Heterosporium interseminatum* (Berk. & Rav.) Atk.), leaf spot. Tex. (1).
Helminthosporium interseminatum Berk. & Rav., on stems. S.C. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Ala., Tex. (1); T.H. (2).
Phoma apocrypta Ell. & Ev., on stems. Tex. (1).
Phomopsis phytolaccae (Berk. & Curt.) Grove, on stems. N.J. to Ala. and Ky. Probably the conidial stage of *Diaporthe arctii.*
?Phyllachora spp., on stems. N.C., Pa. SEE ALSO *Asteroma. P. phytolaccae* (Schw.) Sacc., described as sterile, and believed by Ellis and Everhart to belong to *Asteroma,* has not been confirmed as of fungous origin.
Phyllosticta phytolaccae Cke., leaf spot. Ala., N.J., S.C.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot. Tex.
R. solani Kuehn, root rot. Fla., Tex. (1).
Septoria phlyctaenoides Berk. & Curt., leaf spot. N.J., N.Y., Ohio, Tex. (1).
Uredo panamensis Arth. (II), rust. C.Z. (2).
MOSAIC—virus(es). in part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm., reported in Ill., Ind., Mich. (1); Fla. (2); more commonly a different, unidentified virus, of general occurrence (1).
RING SPOT—virus (*Marmor annularium* McK., Nicotiana virus 12 K.M.Sm.). Va. (1).

Rivina

R. humilis L., rougeplant.

Perennial herb of tropical America, grown for ornament under glass or in the open in the Far South.

Cercospora flagellaris Ell. & G. Martin, leaf spot. Fla., Tex., P.R.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia raunkiaerii Ferd. & Winge (O,I,II,III), rust. Fla., Tex., P.R., V.I.
Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot. Tex.
Septoria rivinae Pat., leaf spot. Tex.

PINACEAE

Abies, fir

I. Eastern Species

(1) *Abies balsamea* (L.) Mill., balsam fir. Range 23,24,26,27.

(2) *A. cephalonica* Loud., Greek fir. Cultivated.

(3) *A. fraseri* (Pursh) Poir, southern balsam fir. Range 27.

Evergreen trees of cooler portion of the Northern Hemisphere; pyramidal in shape; cones erect on outspread branches.

Acanthostigma parasiticum (Hartig) Sacc., needle and twig blight. Said to be common in North America but only definite record we have is from Novia Scotia.

Adelopus nudus (Pk.) Hoehn. (*A. balsamicola* (Pk.) Th.), black mildew. Maine, N.C., N.Y., Wis. (1). Cf. Mycologia 39:479.

Armillaria mellea Vahl ex Fr., on living trees. New England, N.Y. (1).

Bifusella faulii Darker, needle cast. Maine, Mich., N.H., N.Y. (1).

Cenangium ferruginosum Fr. (*C. abietis* (Pers.) Duby), twig blight. Mich., Pa. (1). Pycnidial stage=*Dothichiza ferruginosa* Fr.

Cephalosporium sp., canker. Minn., Wis. (1).

Coniophora puteana (Schum. ex Fr.) Karst., decay of living trees. New England, N.Y. (1).

Cryptosporium macrospermum Pk., associated with canker. New England, N.Y. (1).

Cyptospora pinastri Fr., twig and bark canker. Maine, Wis. (1); on needles. Va. (3). *C. friesii* Sacc. according to Grove (pycnidial stage of *Valsa friesii* Fckl.).

Dasyscypha agassizii (Berk. & Curt.) Sacc., on dead trunks, on branches. Maine, Mich., and widespread (1).

D. arida (Phill.) Sacc., on bark. Mich. (1).

D. calycina (Schum.) Fckl., on bark. Maine (1).

D. resinaria (Cke. & Phill.) Rehm, canker. Minn. (1).

Dimerosporium balsamicola (Pk.) Ell. & Ev., on green needles. N.Y. (1). Probably belongs to the genus *Dimerium* according to Hahn. Cf. Mycologia 39:479.

Fomes pini (Brot. ex Fr.) Karst., on living trees. New England, N.Y. (1).

Gloeosporium balsameae J. J. Davis. Wis. (1).

Hyalopsora aspidiotus (Pk.) Magn., fir-fern rust. Northern part of host range (1). Aecia on 2-year needles; uredia and telia on *Dryopteris disjuncta* (Ledeb.) C. V. Mort.

Hydnum balsameum Pk., wood rot. N.Y. (1).

Hymenochaete tabacina (Sow. ex Fr.) Lév., on living trees. New England, N.Y. (1).

Hypodermella abietis-concoloris (Mayr) Dearn., needle blight. N.C. (3).

H. mirabilis Darker, needle cast. Mich. (1).

H. nervata Darker, needle cast. Maine, N.H., Vt. (1).

Lenzites saepiaria Wulf. ex Fr., on living trees. New England, N.Y. (1).

Lophodermium autumnale Darker, secondary needle cast. Mich. (1).

L. lacerum Darker, needle cast. N.H., N.Y., Pa., Vt. (1).

Melampsora abieti-capraearum Tub., fir-willow rust. Widespread (1). Aecia on new needles, uredia and telia on *Salix* spp.

Melampsorella cerastii (Pers.) Schroet., rust witches'-broom. Widespread (1).

Micropera abietis Rostr., ?dieback. Maine (1). Associated with *Cenangium*.

Milesia fructuosa Faull, fir-fern rust. Maine, N.H., N.Y. (1). Aecia on new needles, uredia and telia on *Dryopteris spinulosa* (O. F. Muell.) Watt.

M. marginalis Faull & W. R. Wats., fir-fern rust. Mass., N.H., N.Y. (1). Aecia on new needles, uredia and telia on *Dryopteris marginalis* (L.) Gray.

M. polypodophila (Bell) Faull, fir-fern rust. Maine, N.H., N.Y., Vt. (1). Aecia on 3- to 9-year needles (perennial), uredia and telia on *Polypodium virginianum* L.

Nectria cucurbitula Sacc. [non (Tode) Fr.] (=*Creonectria cucurbitula* (Sacc.) Seaver), on bark. Maine, Mich. (1).

Ophionectria scolecospora Bref., canker. Widespread (1).

Phacidium abietinellum Dearn., needle blight. N.Y. (1).

P. balsameae J. J. Davis, needle blight. New England (1).

P. infestans Karst., snow blight. New England (1).

?Phaeocryptopus spp.: See *Adelopus nudus*.

Polyporus abietinus Dicks. ex Fr., sapwood rot, on living trees. Minn., New England, N.Y. (1).

P. balsameus Pk., brown cubical butt rot. Minn. and New England, N.Y. to N.C. and Tenn. (1).

P. circinatus Fr., white pocket rot, on living trees. Minn., New England, N.Y. (1).

P. fragilis Fr., heart rot. Mich. (1).

P. guttulatus Pk. — Northeastern and Great Lakes States (1).

P. hirtus Quél., on roots. Mich. (1).

P. schweinitzii Fr., brown butt rot. New England and N.Y. (1).

Poria subacida (Pk.) Sacc., white stringy butt rot, feather rot, spongy root rot. New England and Great Lakes States. (1).

P. vaporaria Fr., brown cubical rot. New England (1).

Pucciniastrum goeppertianum (Kuehn) Kleb. (O,I), fir-huckleberry rust. Maine, Pa., Wis. (1).

P. pustulatum (Pers.) Diet. (O,I), fir-fireweed rust. Mich., N.Y., Wis. (1).

Rehmiellopsis balsamea Waterman, needle blight. Maine, N.H., Vt. (1); R.I. (2); Mass. (3).

R. bohemica Auct. Amer. =*R. balsamea* Waterman. See preceding.

Rhabdogloeum abietinum Dearn., needle blight. N.C. (3).

Rhizosphaera pini (Cda.) Maubl., on needles. N.C. (3).

Sphaeropsis sp. Pa. (3).

S. abietis Povah, on branches. Mich. (1).

Stereum sanguinolentum Alb. & Schw. ex Fr., red heart rot, top or trunk rot. New England, N.Y. (1); Tenn. (3).

Thyronectria balsamea (Cke. & Pk.) Seeler—Mich., Minn., N.Y., Pa. (1).

Trametes heteromorpha (Fr.) Bres., on living trees. New England, N.Y. (1).

Tympanis pinastri Auct. Amer.—Northeastern U.S. (1); common on (1), apparently saprophytic.

Uredinopsis mirabilis (Pk.) Magn., fir-fern rust. Widespread (1); Tenn., W. Va. (3). Aecia on new needles; uredia and telia on *Onoclea sensibilis* L.

U. osmundae Magn., fir-fern rust. Widespread (1). Aecia on new needles, uredia and telia on *Osmunda* spp.

U. phegopteris Arth., fir-fern rust. Wis. (1). Aecia on new needles; uredia and telia on *Dryopteris disjuncta* (Lebed.) C.V.Mort.

U. struthiopteridis Stoerm., fir-fern rust. Mich. (1). Aecia on new needles; uredia and telia on *Pteretis pensylvanica* (Willd.) Fern.

Valsa abietis Fr. (*Cytospora abietis* Sacc.), on twigs. Maine, Pa. (1).

II. Western Species

(1) *Abies amabilis* (Dougl.) Forbes, Pacific silver fir. Range 1 and 4.
(2) *A. concolor* (Gord. & Glend.) Hoopes, Colorado or white fir. Range 4,5,9,10,11, 12,13,14.
(3) *A. grandis* (Dougl.) Lindl., lowland white fir, giant fir. Range 1,2,4,6,7,12.
(4) *A. lasiocarpa* (Hook.) Nutt., alpine fir. Range 12,13,14 (and 4 and 9 at high elevations). Includes var. *arizonica* (Merriam) Lemmon, corkbark fir, of range 13 and 14.
(5) *A. magnifica* A.Murr., California red fir, including var. *shastensis* Lem., Shasta red fir. Range 4.
(6) *A. procera* Rehd. (*A. nobilis* Lindl.), noble fir. Range 1 and 4.
(7) Other species.

Towering to gigantic evergreen trees of western United States; pyramidal in shape; cones erect on outspread branches.

Aleurodiscus amorphus (Pers. ex Fr.) Rabh., canker. On suppressed trees of all *Abies* spp.; general (7).
Arceuthobium campylopodum Engelm. f. *abietinum* (Engelm.) Gill, dwarf mistletoe, witches'-broom. Widespread on western firs in range 1,2,3,4,12,13,14 (7).
A. douglasii Engelm., Douglas-fir dwarf mistletoe. N. Mex. (2).
Armillaria mellea Vahl ex Fr.—N. Mex. (2); Ariz., Colo., N. Mex., Utah (4); widespread, Calif. (7).
Bifusella abietis Dearn., needle cast. Colo., Idaho, Utah (4); on *A. lasiocarpa* var. *arizonica*, N. Mex.
Botrytis sp., seedling twig blight. Idaho (3).
B. cinerea Fr., seedling blight. Mont. (4).
Caeoma faulliana Hunter, needle rust. Oreg. (4).
Coniophora corrugis Burt, sapwood rot. Ariz., Colo., Wyo. (4).
Daedalea confragosa Bolt. ex Fr., white-mottled wound rot. Wash. (3).
Dasyscypha agassizii (Berk. & Curt.) Sacc., on branches. Pacific Northwest (7). Weakly parasitic or saprophytic.
Diaporthe conorum (Desm.) Niessl (*Phomopsis occulta* (Sacc.) Trav.), ?saprophytic on dead branches or trunks (7).
Dimerosporium abietis Dearn., black mildew. Wash. (1); Idaho, Oreg., Wash. (3).
Echinodontium tinctorium Ell. & Ev., brown stringy rot. General on western firs in range 1,2,4,12, and 13 in part (7).
Fomes annosus (Fr.) Cke., spongy sap rot, white pocket rot, brown root and butt rot. Calif. (2,5); widespread, chiefly on stumps and logs (7).
F. applanatus (Pers. ex Fr.) Gill., white mottled rot, white root and butt rot. Widespread on stumps and logs (7).
F. officinalis (Vill. ex Fr.) Faull, brown trunk rot. Occasional on stumps and logs of western firs (7).
F. pini (Brot. ex Fr.) Karst., and/or var. *abietis* Karst., red ring rot. Colo. (4); widespread on standing trees (7).
F. pinicola (Sw. ex Fr.) Cke., brown crumbly rot. Widespread on stumps and logs (7).
F. robustus Karst. var. *tsugina* Baxter—Occasional (7).
F. roseus (Alb. & Schw. ex Fr.) Cke., brown top rot, brown cubical rot. Widespread on trunks and logs (7).
Ganoderma oregonense Murr., white spongy rot on wind-thrown trees. Oreg., Wash. (1).
Herpotrichia nigra Hartig, brown felt blight. General on snow-covered foliage of western firs at high altitudes (7).
Hydnum abietis Hubert, white pocket rot, heartwood rot. On standing trees and logs in Idaho, Mont., Wash. (3); Idaho, Wash. (4).
H. coralloides Scop. ex Fr., heart rot. Idaho, Wash. (2).
Hypoderma robustum Tub. (*Lophodermium infestans* Mayr) needle cast. Oreg. (1); Calif., Wash. (2); Calif., Idaho, Oreg., Wash. (3); Calif. (5); Oreg. (6).
H. robustum Tub. f. *latispora* Dearn., needle cast. Oreg. (1,2).
Hypodermella abietis-concoloris (Mayr) Dearn., needle blight. Calif. (2); widespread on western firs in range 1,2,4,12, and 13 (7).
H. punctata Darker, needle cast. Oreg. (1,2,6), Idaho (3).
Lenzites saepiaria Wulf. ex Fr., brown pocket rot. Wash. (7).
Lophodermium autumnale Darker, secondary needle cast. Oreg. (1,2,6); Calif. (2,5); Idaho, Utah, Wyo. (4).
L. consociatum Darker, secondary needle cast. Oreg., Wash.
L. decorum Darker, needle cast. Mont., Oreg. (3).
L. piceae (Fckl.) Hoehn., tar-spot needle blight. Widespread on eastern and western firs; weakly parasitic or secondary (7).
L. uncinatum Darker, needle cast. Oreg., Wash. (1).
Macrophoma parca (Berk. & Br.) Berl. & Vogl., needle blight. Colo., Idaho, Oreg., Wash. (3); Mont. (4).
Melampsora abieti-capraearum Tub. (O,I), fir-willow rust. Colo., Utah (2); Oreg. (3); Idaho, Mont., Wash. (3,4).
Melampsorella cerastii (Pers.) Schroet., rust witches'-broom, yellow witches'-broom. Wash. (1); Colo., Idaho, Oreg., Utah (2); Idaho, Mont., Oreg., Wash., Wyo. (3); widespread (4); Calif. (5); reported on (6). Aecia on fir branches and trunk; uredia and telia on *Cerastium* and *Stellaria* spp. Weir says "uncommon" on (2,3).
Oxyporus nobilissimus W.B.Cooke, butt rot. Oreg., Wash. (6).
Peridermium sp., needle rust. Oreg. (1). Aecia on 1-year needles; uredia and telia on *Vaccinium* spp. (?*Pucciniastrum myrtilli* [Schum.] Arth.).
P. ornamentale Arth. (O,I), needle rust. Nev., N.Mex., Oreg. (2); Idaho, Mont., Oreg., Wash., Wyo. (4); Oreg., Wash. (6). Arthur, in "Manual of Rusts," 1934, relates this rust to *Pucciniastrum goeppertianum* (Kuehn) Kleb., but this connection is doubted by others. Although reported on various firs, this rust may be restricted to (4).
P. rugosum Jacks., needle rust. Wash. (1,3); Calif., Oreg. (3). Aecia on new needles; II and III unknown.
Phacidium balsameae J.J.Davis, needle blight. Mont., Oreg. (2); Colo., Wash. (4).
P. infestans Karst., snow blight. On snow-covered seedlings and saplings, mostly in Northeastern States (7).
P. infestans Karst. var. *abietis* Dearn., needle blight. Idaho, Oreg. (2); Idaho, Mont., Oreg. (3,4); Wash. (4).
Pholiota flammans Fr., heart rot. Widespread on standing trees and stumps (2,3).
Phoma abietina Hartig, twig canker. Idaho, Mont., Wash. (3,4). According to Hahn not in the U.S.
Phomopsis boycei Hahn, canker. Idaho, Mont. (3).
P. montanensis Hahn, branch canker. Idaho, Mont. (4).
P. occulta (Sacc.) Trav.: See *Diaporthe conorum*.
Phoradendron pauciflorum Torr., mistletoe. Ariz., Calif. (2).
Polyporus abietinus Dicks. ex Fr., pitted sapwood rot,

hollow pocket rot. Idaho, Mont., Wash. (3); general on logs and timber (7).
P. amarus Hedgc.—Idaho (3).
P. anceps Pk., red ray rot. On stumps and logs in Mont. (3).
P. balsameus Pk., root and butt rot. Utah (4).
P. circinatus Fr., root and butt rot. Colo. (4).
P. dryadeus Pers. ex Fr., white root rot. Calif., N.Mex. (2); Idaho, Mont., Oreg., Wash. (3).
P. fibrillosus Karst., on wind-thrown trees. Pacific Northwest (7).
P. schweinitzii Fr., red-brown butt rot. General (7). Weir says "uncommon" in the West.
P. sulphureus Bull. ex Fr., red-brown heart rot. General (7).
P. versicolor L. ex Fr., sapwood rot. Widespread but uncommon on conifers (7).
Poria ferrugineo-fusca Karst., yellow ring rot. Western States (7).
P. subacida (Pk.) Sacc., white spongy root and butt rot. Idaho, Mont. (3); Western States (7).
P. xantha (Fr.) Cke., brown crumbly rot. Northwestern States (7).
Pucciniastrum goeppertianum (Kuehn) Kleb., fir-huckleberry rust. Oreg., Wash. (1,3,6); Calif., Colo., N.Mex., Oreg. (2); Mont. (3); widespread (4); Calif., Oreg. (5). Aecia on new needles, telia on *Vaccinium* spp.
P. pustulatum (Pers.) Diet., fir-fireweed rust. Wash. (1,3); Oreg. (2,3,6); Colo. (2); Idaho, Mont. (3); widespread on (4); on *A. lasiocarpa* var. *arizonica* in Colo. Aecia on new needles, uredia and telia on *Chamaenerion* and *Epilobium*. The form on *Epilobium* is sometimes distinguished as a separate species, *Pucciniastrum epilobii* Otth.
Rehmiellopsis balsamea Waterman, needle blight. Maine, Mass., N.H., N.Y., R.I., on cultivated trees (2); in cultivation, Mass. (6).
R. bohemica Auct. Amer. =*R. balsamea* Waterman. SEE preceding.
Rhizina inflata (Schaeff.) Sacc., seedling root rot. Idaho, Mont. (3).
Scleroderris abieticola Zeller & Goodding, twig and branch canker. Oreg. (1,3).
Sphaeropsis sp., dieback. Md., N.Y. (2) (in cultivation).
Stereum chailletii Pers. ex Fr.—(7).
S. purpureum Pers. ex Fr.—(7).
S. sanguinolentum Alb. & Schw. ex Fr., red heart rot, mottled bark, on living trees. On saplings in Idaho (3); Colo., Idaho (4).
Thelephora terrestris (Ehr.) Fr., smothering of seedlings. Idaho (3).
Thyronectria balsamea (Cke. & Pk.) Seeler, bark canker. Colo. (4).
Trichosporium symbioticum Wright, sapwood stain, tracheomycosis. Calif. (2).
Uredinopsis macrosperma (Cke.) Magn., fir-fern rust. Oreg., Wash. (1,3); Calif. (2,3); Idaho, Mont. (3); Wash. (4); Oreg. (6). Aecia on 1-year-old needles; uredia and telia on *Pteridium aquilinum* (L.) Kuhn.
U. struthiopteridis Stoerm., fir-fern rust. Idaho, Oreg., Wash. (3,4); Oreg., Wash. (6). Arthur, in "Manual of Rusts," 1934, lists this rust on various western firs with the uredial stage on various ferns, but Faull in Contrib. Arnold Arbor. 11, 1938, restricts it to *Abies balsamea* (L.) Mill. and *Pteretis pensylvanica*.
Valsa abietis Fr. (*Cytospora abietis* Sacc.), branch and trunk canker. Calif., Oreg. (2); Calif. (5).

Araucaria[9]

(1) *A. araucana* (Molina) K.Koch., monkey-puzzle.
(2) *A. bidwillii* Hook., bunya-bunya.
(3) *A. brasiliana* A. Rich.

Tall, conical, evergreen trees: (1) of tropical America, cultivated in the Far South and California; (2) cultivated in California; (3) southern Brazil.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Calif. (2).
Leptosphaeria californica (Cke. & Harkn.) Berl. & Vogl.—Calif. (1).
Pestalotia funerea Desm., on leaves. Calif. (1).
P. micheneri Guba, on leaves. Pa. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Stictis araucariae Phill. & Harkn., on leaves. Calif. (1).

Cedrus, cedar

Cedrus spp.: *C. atlantica* Manetti, Atlas cedar; *C. deodara* (Roxb.) Loud., Deodar cedar; and *C. libanensis* Juss., cedar of Lebanon.

Large, evergreen trees, native of the Mediterranean region and southwestern Asia, cultivated in warm temperate zones of the United States.

Armillaria mellea Vahl ex Fr., root rot. Miss.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Diplodia pinea (Desm.) Kickx (*Sphaeropsis ellisii* Sacc.), canker, dieback. Ala.
Fomes pini (Brot. ex Fr.) Karst., root rot, heart rot. Occasional.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Chamaecyparis, white-cedar, cypress

See page 113.

Cryptomeria

C. japonica (L. f.) D. Don, cryptomeria.

Pyramidal, evergreen trees of Japan, cultivated in zones of intermediate hardiness.

?Diaporthe eres Nits., on twigs. N.Y.
Pestalotia cryptomeriae Cke., on needles. S.C.
P. funerea Desm.—N.J.

Cupressus, cypress

See page 114.

Juniperus, juniper

See page 114.

Larix, larch

(1) *L. decidua* Mill., European larch. Zone 2.
(2) *L. laricina* (DuRoi) K. Koch, tamarack, Eastern larch. Range 22,23,24,26,27.
(3) *L. leptolepis* (Sieb. & Zucc.) Gord. (*L. kaempferi* Sarg. non Carr.), Japanese larch. Cultivated in zone 4.
(4) *L. occidentalis* Nutt., Western larch, in-

[9] Sometimes segregated as a family, the Araucariaceae.

cluding records on *L. lyallii* Parl., Alpine larch. Range 4 and 12.

(5) Other species.

Deciduous resinous trees: (1) of Europe, cultivated in several horticultural forms; (3) of Japan.

Aleurodiscus amorphus (Pers. ex Fr.) Rab., on bark, ?canker. Idaho, Mont. (4); Minn., Northwestern States (5).

A. spinulosus Burt, on bark, sometimes on living trees. Idaho, Mont. (4); Northwestern States (5).

A. weirii Burt, on bark, sometimes on living trees. Idaho (4); Northwestern States (5).

Arceuthobium campylopodum f. *laricis* (Engelm.) Gill, dwarf mistletoe. Northwestern States (4); Mont. to Oreg., Wash. (5).

A. pusillum Pk., dwarf mistletoe. Northeastern States (5).

Armillaria mellea Vahl ex Fr., root rot. Mont., Idaho (4); cosmopolitan (5).

Botrytis douglasii Tub. (?*B. cinerea* Fr.), gray mold (of seedlings). Northwestern States (4).

Ceratostomella pseudotsugae Rumbold, blue wood-stain. Oreg., Wash. (4).

Corticium spp.—Idaho, Mont. (4).

Cylindrocladium scoparium Morg., seedling root rot. N.J. (3).

Cytospora sp., on twigs. Mass. (1).

Dasyscypha arida (Phill.) Sacc.—Mont. (4).

D. calyciformis (Willd.) Rehm—Idaho (4).

D. calycina Fckl., on dead branches. Mass. (1,3,5); Conn., Vt. (2).

D. ellisiana (Rehm) Sacc., on twigs. N.Y., R.I. (1,5); Mass. (3,5).

D. oblongospora Hahn & Ayers, on dead branches. Maine, Mass., Mich., N.Y., Pa. (1); New England to Pa. and Mich. (2); Mass. (3); New England to Mich. (5).

D. occidentalis Hahn & Ayers, on dead branches. Mass., N.Y. (1); N.Y., Pa., Vt. (2); Mass. (3); Mont. to Oreg. (4); New England to Pa., Northwestern States (5).

D. wilkommii (Hartig) Rehm, canker. Mass. (1,5); Mass. (3), resistant. Eradicated by 1949.

Fomes annosus (Fr.) Cke., white pocket heart rot, butt rot. Northwestern States (4); widespread (5).

F. nigrolimitatus (Rom.) Egel. (*F. putearius* Weir), white pocket rot. Idaho, Mont., Wash. (4).

F. officinalis (Vill. ex Fr.) Faull (*F. laricis* Jacq. ex Murr.), brown cubical heart rot. Wis. (2); Northwestern States (4); Western States (5).

F. pini (Brot. ex Fr.) Karst., red ring rot, pocket rot. Mass. to Minn. (2); general (4,5).

F. pinicola (Sw. ex Fr.) Cke., brown crumbly heart rot. N.Y., Wis. (2); general (4,5).

F. subroseus (Weir) Overh. (*Trametes subroseus* Weir), brown pocket heart rot. Widespread (2,4,5).

Hydodermella laricis Tub., needle and shoot blight. Northwestern States (4); Great Lakes to Pacific Northwest (5).

Lentinus lepideus Fr., brown cubical rot of timber. Cosmopolitan (5).

Lenzites saepiaria Wulf. ex Fr., brown sapwood rot, sometimes on living trees. Ind. (5).

Lophodermium sp., leaf cast. Wash. (5).

L. laricinum Duby, needle blight. Mont. to Oreg. (4).

L. laricis Dearn., needle blight. Idaho (4).

Melampsora bigelowii Thuem. (O,I), needle rust. Ind., N.Y. (1); Alaska to Great Lakes States and New England (2); Mont. to Oreg. (4); northern U. S., Maine to Colo. and Oreg. (5). II and III on *Salix* spp.

M. medusae Thuem. (O,I), needle rust. New England to Mich. and Ind. (2); northeastern U. S. (5). Also reported on (4) in Mont. and Oreg. but Arthur's "Manual of the Rusts" does not list this rust on western larches. II and III on *Populus* spp.

Melampsoridium betulinum (Pers.) Kleb. (O,I), needle rust. Conn., Wis. (2,5). II and III on *Betula* spp.

Meria laricis Vuill., needle blight. Idaho (4).

Orcadella operculata Wingate, myxomycete, on bark. Minn. (5).

Phialea acicularum (Rolland) Rehm, on fallen needles. Mich. (2).

Phomopsis occulta (Sacc.) Trav., on dead branches. Widespread (3,5). Conidial stage of *Diaporthe conorum* (Desm.) Niessl.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).

Physalospora obtusa (Schw.) Cke., on branches. Occasional (5).

Phytophthora cinnamomi Rands, seedling root rot. Md. (1,3).

Polyporus spp., especially *P. adustus* Willd. ex Fr., *P. alboluteus* Ell., and *P. fibrillosus* Karst., wood rot of dead trees and logs. Widespread (5).

P. abietinus (Dicks.) Fr.—Ind., Minn. (5).

P. berkeleyi Fr., butt rot. Idaho, Mont. (5).

P. circinatus Fr., root and butt rot. Idaho, Mont. (4); widespread (5).

P. floriformis Quél., butt rot. Mich. (5).

P. schweinitzii Fr., root and butt rot. Widespread (2,4,5).

P. sulphureus Bull. ex Fr., brown cubical heart rot. Idaho, Mont., Oreg., Wash. (4); widespread (5).

P. versicolor L. ex Fr.—Maine and widespread (5).

Poria subacida (Pk.) Sacc., wood rot of logs and timber. New England (5).

P. vaporaria Fr., brown cubical rot. Idaho, Wash. (4).

P. versipora Pers. ex Rom.—(4).

P. xantha (Fr.) Cke.

Rhizina undulata Fr., seedling blight. Idaho (4).

Rhizoctonia solani Kuehn, damping-off. Cosmopolitan (5).

Sparassis radicata Weir, root rot. Mont. to Oreg., and Wash. (4).

Stereum spp., especially *S. chailletii* Pers., *S. rugisporum* (Ell. & Ev.) Burt, and *S. sulcatum* Burt, wood rots of dead trees and logs. Widespread (5).

S. sanguinolentum Alb. & Schw. ex Fr., root and butt rot, sapwood rot. Idaho (1,4); widespread (5).

Thelephora caryophyllea Schaeff. ex Fr. and *T. terrestris* Ehr. ex Fr., girdle or smother of seedlings. Idaho, Mont. (4).

?Trametes carbonaria (Berk. & Curt.) Overh., on charred wood. Pacific Northwest (5).

T. heteromorpha (Fr.) Bres.—(5).

T. variiformis Pk.—(5).

Valsa abietis Fr., on dead branches. N.Y. (2,5); Ohio, Pa. (5).

V. ambiens Pers. ex Fr.—Mich. (2).

Libocedrus

See page 117.

Picea, spruce

I. Eastern Species

(1) *Picea abies* (L.) Karst. (*P. excelsa* Link), Norway spruce.

Tall tree of Central and Northern States, long cultivated in the United States and locally naturalized in the East; there are numerous varieties and horticultural forms.

(2) *P. mariana* (Mill.) B.S.P., black spruce; including several horticultural forms.

(3) *P. rubens* Sarg. (*P. rubra* Link), red spruce.

Evergreen trees of pyramidal habit: (2) of range 23,24,26,27; (3) of range 27; both cultivated in zone 2.

Arceuthobium pusillum Pk., witches'-broom. New England to Great Lakes, Minn., Wis. (3).
Ascochyta piniperda Lindau, seedling twig blight. N.C. (1,3).
Botryosphaeria ribis Gross. & Dug., on twigs. Ill. (1).
Botrytis cinerea Pers. ex Fr., mold of snow-smothered nursery plants. N.J. (1).
Chrysomyxa sp., needle rust. Minn., Wis. (2).
C. cassandrae (Pk. & G.W.Clint.) Tranz. (O,I), needle rust. Conn., N.Y. to Minn. (2); Mich., N.Y. (3).
C. chiogenis Diet., needle rust. Only II and III on *Chiogenes hispidula* Torr. & Gray reported in U. S.
C. empetri (Pers.) Schroet. (O,I), needle rust. Maine (3). II on *Empetrum nigrum* L. reported in the U. S.
C. ledi (Alb. & Schw.) d By. (O,I), needle rust. New England to Great Lakes (2); Maine (3).
C. ledicola (Pk.) Lagh. (O,I), needle rust. New England to Great Lakes (2); N.H., N.Y. (3).
C. pyrolae (DC.) Rostr. (O,I), cone rust. Mass. (1); Alaska, Maine, N.H., Pa. (2); Maine, N.Y., Pa., Vt. (3).
C. roanensis Arth. (O,I), needle rust. N.C., Tenn. (3). II and III on *Rhododendron catawbiense* Michx.
C. weirii Jacks. (III), needle rust. Tenn., W. Va. (3).
Cylindrocladium scoparium Morg., damping-off. N.J. (1).
Cytospora spp., *C. chrysosperma* Pers. ex Fr. and *C. leucostoma* Pers. ex Sacc., canker, twig blight. Mass. to N.J. and Ill. (1).
C. kunzei Sacc., twig blight. N.Y. (3).
Dasyscypha abietis (Karst.) Sacc., on twigs. N.Y., Vt. (3).
D. agassizii (Berk. & Curt.) Sacc., on twigs. Mich., N.Y. (2); N.Y., Vt. (3).
D. calycina Fckl., on twigs. Mich., N.Y. (2).
Fomes annosus (Fr.) Cke., butt rot, white spongy heart rot. Maine, Vt. (3).
F. officinalis (Vill. ex Fr.) Faull, brown trunk rot. Minn. (2).
F. pini (Brot. ex Fr.) Karst., white pocket rot, red ring rot, resinosis. Widespread (2); New England, N.C. (3).
F. pinicola (Sw. ex Fr.) Cke., brown crumbly rot. Widespread (2); New England, Tenn. (3).
F. roseus (Alb. & Schw. ex Fr.) Cke., brown heart rot. New England (3).
F. subroseus (Weir) Overh., brown heart rot. New England (2,3).
Ganoderma lucidum (Leyss. ex Fr.) Karst. (*G. tsugae* Murr.), white spongy sapwood and heart rot. Pa. (1).
Herpotrichia nigra Hartig, brown felt blight; on snow-smothered foliage. On cultivated specimens in Colo., Oreg., Wyo. (1).
Lenzites saepiaria Wulf. ex Fr., brown pocket rot. N.Y. (2).
Lophodermium filiforme Darker, tar spot, needle cast. N.Y. (3).
L. piceae (Fckl.) Hoehn., tar spot, needle cast. Mass., Mich. (1); Maine (2); N.Y. (3).
Melampsorella cerastii (Pers.) Schroet., rust witches'-broom. On cultivated specimens in Idaho, Mont., Wash., Wyo. (1); Maine, Mich., Wis., and Alaska (2); Maine, N.Y. (3).
Pestalotia spp., on cones and twigs. Species reported: *P. funerea* Desm.—Mass. (1); *P. stevensonii* Pk., on cone scales in Pa. (1); and *P. truncata* Lév.—N.Y. (1).
Phacidium expansum J.J.Davis, on twigs. Wis. (2).
P. infestans Karst., snow blight. New England (2,3).
Phoma piceina Pk., on twigs, ?needle blight. Md., N.Y., Ohio (1); N.Y. (3).
P. strobiligena Desm., on cone scales. Maine, Ohio (1).
Phragmotrichum chailletii G. Kunze, on cones. N.C., N.Y. (3).
Phytophthora cinnamomi Rands, seedling blight, damping-off, seedling root rot. Md., Va. (1).
Polyporus spp., wood rots of logs and timber, or sometimes on living trees. Species reported include: *P. abietinus* Dicks. ex Fr.—(2); *P. alboluteus* Ell. & Ev.—Mich. (2); N.Y. (3); *P. alutaceus* Pk.—Maine (2); *P. anceps* Pk.—N.Y. (2); N.H., Vt. (3); *P. borealis* Fr.—Minn. (2); N.Y., Tenn. (3); *P. circinatus* Fr.—Minn. (2); *P. fibrillosus* Karst. —Minn. (2); N.C., N.Y. (3); *P. fragilis* Fr.—Minn. (2); *P. guttulatus* Pk.—Minn. (2); *P. lapponicus* Rom.—N.H. (3); *P. schweinitzii* Fr.—Minn., New England (2); Maine, N.Y., Vt. (3); *P. sulphureus* Bull. ex Fr.—Maine (3); *P. ursinus* Lloyd—N.H. (3); *P. versicolor* L. ex Fr.—Widespread (3); and *P. volvatus* Pk. on (2) throughout coniferous forest regions of the U. S.
Poria spp., including *P. millavensis* Bourd. & Galz.; *P. subacida* (Pk.) Sacc.—Vt. (3); *P. radula* Fr. and *P. xantha* (Fr.) Cke.—Maine (3); *P. vaporaria* Fr.—Great Lakes region (2); New England (3).
Sclerotinia fuckeliana d By.—N.C. (1). Report assumes *S. fuckeliana* to be the perfect stage of *Botrytis cinerea*.
Sclerotium bataticola Taub., damping-off. N.C. (1).
Sphaeropsis ellisii Sacc., collar rot. N.J. (1).
Stereum abietinum Pers.—N.Y. (2).
S. sanguinolentum Alb. & Schw. ex Fr., white pocket rot, sapwood rot. On cultivated specimen in Idaho (1).
Thelephora terrestris (Ehr.) Fr., seedling smother. Minn. (2).
Trametes spp., rot of logs and timber. Species reported include: *T. serialis* Fr. (*Poria callosa* (Fr.) Sacc.) —New England (3); *T. setosus* Weir—Alaska (2); *T. tenuis* Karst. (*T. isabellina* Fr.)—Northwestern States to Alaska (1); *T. trabea* (Pers.) Fr.—N.Y. (2); *T. variiformis* Pk.—New England States (3).

II. Western Species

(1) *Picea engelmanni* Parry ex Engelm., Engelmann spruce.

(2) *P. pungens* Engelm., blue spruce, Colorado spruce.

(3) *P. sitchensis* (Bong.) Carr., Sitka spruce.

Evergreen pyramidal trees: (1) of range 4,9,11,12,13,14,15, and cultivated, zone 2; (2) of range 9,12,13,14, and cultivated in several horticultural forms, zone 2; (3) of range 1 and cultivated in the western part of zone 6, an important wood for airplane propellors.

Aleurodiscus amorphus (Pers. ex Fr.) Rab. and *A. subcruentatus* (Berk. & Curt.) Burt, on branches and trunks, sometimes of living trees. Calif., Oreg. (3).
Arceuthobium campylopodum Engelm. f. *microcarpum* (Engelm.) Gill, witches'-broom, dwarf mistletoe. Northern and southern Rocky Mountains. Tex. (1,2); N.Mex. (2).
A. pusillum Pk.—Maine (2).
Armillaria mellea Vahl ex Fr., root rot. Ariz., Colo., N.Mex., Utah (1); Oreg., Wash. (3).
Ascochyta piniperda Lindau, twig blight. Maine (2).
Atropellis treleasei (Sacc.) Zeller & Goodding, on bark, ?canker. Alaska (3).

Chrysomyxa cassandrae (Pk. & G.W. Clint.) Tranz. (O,I), needle rust. Wis. (1); Minn., N.H., Wis. (2).
C. ledi (Alb. & Schw.) d By. (O,I), needle rust. Minn. (2).
C. ledicola (Pk.) Lagh. (O,I), needle rust. Colo., Idaho (1); Maine, Minn., N.Y., Wis. (2); Alaska, Wash. (3).
C. piperiana (Arth.) Sacc. & Trott. (*Peridermium parksianum* Faull) (O,I), needle rust. Calif., Oreg. (3). II and III on *Rhododendron californicum* Hook.
C. pyrolae (DC.) Rostr. (O,I), cone rust. Colo., Mont., Oreg. (1).
C. weirii Jacks. (III), needle rust. Mont. to Oreg. and Wash. (1).
Coniophora corrugis Burt, sapwood rot of logs or sometimes living trees. Colo., Idaho, Wyo. (1).
C. puteana (Schum. ex Fr.) Karst., brown butt rot, Colo. (1).
Cytospora kunzei Sacc., canker, twig blight. New England to Ill. and Minn. (2).
Dasyscypha agassizii (Berk. & Curt.) Sacc. and *D. arida* (Phill.) Sacc., on twigs. Colo., Wash. (1).
D. ellisiana (Rehm) Sacc., on twigs. Mass. (1,2).
D. oblongospora Hahn & Ayers, on dead twigs. Mass., Pa. (2).
Diedickea piceae Bonar, needle cast. Calif. (3).
Diplodia pinea (Desm.) Kickx (*Shaeropsis ellisii* Sacc.), twig blight, ?collar rot. N.Y. (2).
Echinodontium tinctorium Ell. & Ev., brown stringy heart rot. Idaho, Mont., N. Mex., Utah. (1).
Fomes annosus (Fr.) Cke., white pocket rot. N.Mex., northern Rocky Mountain States (1); Alaska, Calif., Oreg., Wash. (3).
F. applanatus (Pers. ex Fr.) Gill., white-mottled heart rot. Oreg., Wash. (3).
F. nigrolimitatus (Rom.) Egel., white pocket rot. Northern Rocky Mountain States (1).
F. officinalis (Vill. ex Fr.) Faull, brown cubical heart rot. Widespread (1); Oreg., Wash. (3); heart rot of living trees in Alaska (3).
F. pinicola (Sw. ex Fr.) Cke., brown cubical heart rot. Widespread (1); Colo. (2); Oreg. (3); heart rot of living trees in Alaska.
F. pini (Brot. ex Fr.) Karst., white pocket heart rot. Colo., Wyo., widespread (1); Colo. (2); Calif. to Alaska (3); causes heart rot of living trees in Alaska.
F. roseus (Alb. & Schw. ex Fr.) Cke. and *F. subroseus* (Weir) Overh., brown cubical heart rot. Occasional, Tex. (1); Pacific Northwest (3).
Fusarium scirpi Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr., snow mold of nursery plants. Colo. (1).
Ganoderma oregonense Murr., rot of logs and stumps. Oreg., Wash. (3).
Herpotrichia nigra Hartig, brown felt blight. Northern Rocky Mountains, Pacific Northwest (1); Mont. (2).
H. quinqueseptata Weir—Colo., Idaho (1).
Hydnum coralloides Scop. ex Fr., white pocket heart rot. Idaho, Mont., Wash. (1).
Lentinus kauffmanii Bier & Nobles, brown pocket rot of timber. ?Calif., Oreg., Wash. (3); heart rot of living trees. Alaska (3).
L. lepideus Fr., heart rot. Ariz. (1).
Lenzites saepiaria Wulf. ex Fr., sapwood rot of logs and slash, decay of wind-thrown trees. Colo., N. Mex., Wash., Wyo. (1); Pacific Northwest (3).
Lophodermina septata Tehon, tar spot, needle cast. Oreg. (3).
Lophodermium filiforme Darker, tar spot, needle cast. Colo. (1).
L. piceae (Fckl.) Hoehn., tar spot, needle cast. Oreg., Wash. (1); Mich. (2); Alaska, Calif., Oreg. (3).
Melampsorella cerastii (Pers.) Schroet. (O,I), rust witches'-broom. Northern and southern Rocky Mountain States (1); Mont. and S. Dak. to N. Mex., also Alaska, Pacific Northwest (3).
Pestalotia sp., ?blight. Tex. (1).
Phomopsis occulta (Sacc.) Trav., on twigs. N.J. (2). Conidial stage of *Diaporthe conorum* (Desm.) Niessl.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Phytophthora cinnamomi Rands, root rot of seedlings. Md. (2).
Polyporus abietinus Dicks. ex Fr., sapwood rot of down trees and of logs. Wyo. (1); Pacific Northwest (3).
P. alboluteus Ell. & Ev., white pocket rot, sapwood rot of logs and down trees. Colo. to Mont. and Wash. (1); Alaska, Wash. (3).
P. amorphus Fr.—Alaska (3).
P. anceps Pk., red ray rot, white pocket heart rot. Colo., N. Mex. (1); Alaska (3).
P. balsameus Pk., root and butt rot. Colo. (1), Alaska (3).
P. berkeleyi Fr., root and butt rot. Calif. (3).
P. borealis Fr., heart rot of living trees. Alaska (3).
P. caesius Schrad. ex Fr.—Calif. (3).
P. circinatus Fr., root and butt rot, white pocket rot. Colo., Idaho, N. Mex., Utah (1).
P. destructor Schrad. ex Fr.—Wash. (3).
P. dryadeus Pers. ex Fr., root rot, white spongy heart rot. Colo. to Mont. and Wash. (1).
P. fibrillosus Karst., sapwood rot of logs and down trees. Pacific Northwest (3).
P. schweinitzii Fr., root and butt rot, reddish brown heart rot. Northern Rocky Mountains (1); Calif., Oreg., Wash., Alaska (3). Reported to cause heart rot of living trees in Alaska (3).
P. sulphureus Bull. ex Fr., heart rot of living trees. Alaska (3).
P. versicolor L. ex Fr., sapwood rot of logs and down trees. Pacific Northwest (3).
P. volvatus Pk.—Wash. (3).
Poria spp., including: *P. crustulina* Bres.—Mont., Wash., Alaska (3); *P. lenis* Karst.—Calif., Oreg., Alaska (3); *P. reticulata* Pers. ex Fr.—Wash. (3); *P. sitchensis* Baxter—Calif., Oreg., Alaska (3); *P. subacida* (Pk.) Sacc.—Wash., Alaska (3); and *P. vaporaria* Fr.—Alaska (3).
Pythium debaryanum Hesse, damping-off. Tex. (1).
Rhizoctonia solani Kuehn, damping-off. Tex. (1).
Rhizosphaera kalkhoffii Bub., leaf cast. Conn., N.Y., Va. (2).
Rosellinia thelena (Fr.) Rab., on branches. Alaska (3).
R. weiriana Sacc., on twigs. Wash. (1).
Sparassis radicata Weir, root rot. Idaho, Mont., Oreg., Wash. (1).
Stereum sanguinolentum Alb. & Schw. ex Fr., ?heart rot. Colo. (1).
S. sulcatum Burt, yellow string rot, butt rot. Colo. (1).
Trametes alaskana Baxter—Alaska (3).
T. heteromorpha (Fr.) Bres., brown pocket rot of logs and timber, brown cubical heart rot. Colo. (1); Pacific Northwest to Alaska (3).
T. serialis Fr. (*Poria callosa* (Fr.) Sacc.), brown pocket rot of logs and timber. Colo. (1); Pacific Northwest to Alaska (3); at least in part=*Poria microspora* Overh., brown cubical rot in British Columbia, ?U.S.
T. tenuis Karst. (*T. isabellina* Fr., *Poria isabellina* (Fr.) Overh.), white pocket heart rot. Colo., Mont. (1).
T. variiformis Pk.—Alaska (3).

III. Cultivated and Miscellaneous Species

(1) *Picea glauca* (Moench) Voss (?*P. canadensis* (L.) B.S.P.), white spruce.

Tree of range 12,15,21,23,24,26,27; also cultivated, zone 2. Several varieties have distinctive names, such as *P. glauca* var. *densata* Bailey, Black Hills spruce; *P. glauca* var. *albertiana* (S.Br.) Sarg., western white spruce; *P. glauca* f. *conica* Rehd., dwarf Alberta spruce, and others.

(2) Other species.

Aleurodiscus amorphus (Pers. ex Fr.) Rab., typically on dead trunks and branches, sometimes on living trees. Widespread (2).

Arceuthobium pusillum Pk., witches'-broom. Northeastern and Great Lakes States but infrequent (1); Mich., Minn. (2). Steinmetz also reports it abundant on (2) in Maine.

Armillaria mellea Vahl ex Fr., root rot. Ariz., Colo., N. Mex., Wash. (2).

Ascochyta piniperda Lindau, seedling twig blight. N.C. (1,2), Maine (2).

Botrytis cinerea Pers. ex Fr., seedling blight. Cosmopolitan (2).

Cenangium ferruginosum Fr. (*C. abietis* Pers. ex Rehm) on twigs and cones. Colo., Maine, Va. (2).

Chrysomyxa (*Melampsoropsis*) *cassandrae* (Pk.) & G. W.Clint.) Tranz. (*Peridermium consimile* Arth. & Kern) (O,I), needle rust. Minn., Wis. (1); New England to Great Lakes States (2). II and III on *Chamaedaphne calyculata* (L.) Moench.

C. chiogenis Diet. (O,I), needle rust. Not yet collected on spruce but shown by inoculation to produce aecia on (1) and *P. mariana* (Mill.) B.S.P.; II and III on *Chiogenes hispidula* (L.) Torr. & Gray in N.Y. and Wis.

C. empetri (Pers.) Schroet. (O,I), needle rust. Not collected on spruce in U.S., but II occurs on *Empetrum nigrum* L. in N.Y. to Maine.

C. ledi (Alb. & Schw.) d By. (*Melampsoropsis abietina* Arth., *Peridermium abietinum* Thuem.) (O,I), needle rust. New England to Great Lakes States (2). II and III on *Ledum* spp.

C. ledicola (Pk.) Lagh. (*Melampsoropsis ledicola* Arth., *Peridermium decolorans* Pk.) (O,I), needle rust. Alaska, Minn. (1); northern U.S. and Alaska (2). II and III on *Ledum* spp.

C. pyrolae (DC.) Rostr. (*Melampsoropsis pyrolae* Arth., *Peridermium conorum* Thuem.) (O,I), cone rust. Maine, Mich. (1); New England to Great Lakes States and northern Rocky Mountain States States (2). II and III on *Moneses* and *Pyrola* spp.

Coniophora spp., dry rot of logs and timber. Species reported include: *C. arida* (Fr.) Karst.—Widespread; *C. corrugis* Burt, sometimes on living trees—Northern Rocky Mountains (2).

Cytospora kunzei Sacc., twig blight. Mass., N.J. (1); New England, N.Y. (2).

Dasyscypha arida Phill.—Colo. (2).

D. ellisiana (Rehm) Sacc., on twigs. Mass. (2).

Fomes annosus (Fr.) Cke., brown root and butt rot, white spongy heart rot. New England, northern Rocky Mountain States, Pacific coast to Alaska (2).

F. applanatus (Pers. ex Fr.) Gill., white-mottled heart rot. Pacific Northwest (2).

F. nigrolimitatus (Rom.) Egel., white pocket rot of logs. Pacific Northwest (2).

F. officinalis (Vill. ex Fr.) Faull (*F. laricis* Jacq. ex Murr.), brown cubical heart rot. Minn., S. Dak. (1); Pacific coast, northern Rocky Mountain States to Great Lakes (2).

F. pini (Brot. ex Fr.) Karst. (*Trametes pini* Brot. ex Fr.), red ring rot, white pocket heart rot. Widespread (1,2).

F. pinicola (Sw. ex Fr.) Cke., brown crumbly heart rot. Widespread (1,2).

F. roseus (Alb. & Schw. ex Fr.) Cke., brown cubical heart rot. Widespread (1); New England, northern Rocky Mountains, Pacific Northwest, Tex. (2).

F. subroseus (Weir) Overh., brown top rot of standing trees, brown pocket rot of timber. Widespread (1); New England, northern Rocky Mountains, Pacific Northwest (2).

Herpotrichia nigra Hartig, brown felt blight; on snow-smothered foliage. Northern Rocky Mountains, Pacific Northwest (2).

H. quinqueseptata Weir—Oreg. (2).

Hypochnus ferruginosus (Hoehn. & Litsch.) Burt—Alaska (1).

Lentinus lepideus Fr., brown cubical rot of logs, stumps, and timber. Cosmopolitan (2).

Lenzites saepiaria Wulf. ex Fr., brown sapwood rot, sometimes heart rot of logs, timber, and slash. Alaska, Maine, N.Y., S. Dak., Vt. (1); cosmopolitan (2).

L. trabea Pers. ex Fr.—N.Y. (2).

Lophodermium abietis Rostrup—N.Y. (2).

L. filiforme Darker, tar spot, needle cast. Alaska, Colo., N.Y. (2).

L. piceae (Fckl.) Hoehn., tar spot, needle cast. Mich. (1); New England to Great Lakes States, Pacific Northwest (2).

Melampsorella cerastii (Pers.) Schroet. (*Peridermium coloradense* Arth. & Kern) (O,I), rust witches'-broom. Northern U.S. to Alaska (1); widespread (2).

Melampsoropsis spp.: SEE *Chrysomyxa.*

Nectria cucurbitula Tode ex Fr., on dead branches. New England (2). Sometimes a wound parasite (England).

Neopeckia coulteri (Pk.) Sacc., brown felt blight. Colo. (2).

Pellicularia vaga (Berk. & Curt.) Rogers ex Linder—Alaska, S. Dak.

Peniophora gigantea (Fr.) Mass., rot of logs, timber, and slash. Widespread (2).

Peridermium spp.: SEE *Chrysomyxa, Melampsorella, Pucciniastrum.*

Phacidium infestans Karst., snow blight of nursery plants. Maine, New England (1,2).

Phomopsis conorum (Sacc.) Died., on snow-blighted seedlings. Maine (2).

P. occulta (Sacc.) Trav., twig blight, probably secondary. New England (2). Conidial stage of *Diaporthe conorum* (Desm.) Niessl.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).

Phyophthora cactorum (Leb. & Cohn) Schroet., seedling blight. N.Y., Va. (2).

P. cinnamomi Rands, seedling blight, damping-off, seedling root rot. N.Y., Va. (2).

Polyporus spp., wood rot, chiefly of dead standing trees, logs, stumps, and slash; sometimes wound rot and heart rot of living trees. Species reported include the following:

P. abietinus Dicks. ex Fr., white pocket rot. Alaska, Maine (1); widespread (2).

P. alboluteus Ell. & Ev., white pocket rot. Great Lakes to Colo., Pacific Northwest, and Alaska (2).

P. amorphus Fr.—Pa. to northern Rocky Mountains, Alaska (2).

P. anceps Pk., red ray rot, white pocket heart rot. Pa. to northern Rocky Mountains (2).

P. borealis Fr., white-mottled heart rot. New England to northern Rocky Mountains (2).

P. cinnabarinus Jacq. ex Fr.—N.C., N.Y. (2).

P. circinatus Fr., butt and root rot, white pocket heart rot. Minn. (1); N.Y. to Idaho (2).

P. dryadeus Pers. ex Fr., root rot, white spongy heart rot. Northern Rocky Mountains (2).

Polyporus fibrillosus Karst.—N.Y. to N.C., Mont., Wash. (2).
P. fragilis Fr.—N.Y. to Minn. (2).
P. guttulatus Pk., root and butt rot. Widespread (1); N.Y. to Wash. (2).
P. leucospongia Cke. & Harkn.—Rocky Mountain States to Calif. (2).
P. resinosus Schrad. ex Fr.—N.Y. to Rocky Mountains (2).
P. schweinitzii Fr., root and butt rot, brown cubical rot. Widespread (1,2).
P. sulphureus Bull. ex Fr., brown cubical rot. Maine (1,2); Pacific Northwest (2).
P. tomentosus Fr., associated with *P. circinatus* as agent of butt rot. Reported in Quebec, Canada; ?present in New England (2).
P. ursinus Lloyd—Colo., Wyo. (2).
P. versicolor L. ex Fr.—Widespread (2).
P. volvatus Pk.—Widespread (2).

Poria spp., typically on logs, stumps, and slash; none characterized as causing economic rots of spruce. Species reported include:
P. asiatica Pilát—Idaho, Mont. (2).
P. candidissima (Schw.) Cke. (*P. subtilis* (Schrad.) Bres.—N.Y. (2).
P. conwayana Pilát—N.Y. (2).
P. crustulina Bres.—Alaska, northwestern U.S. (2).
P. lenis Karst.—(1).
P. mollusca Pers. ex Bres.—(2).
P. purpurea (Fr.) Cke.—(2).
P. rufa Fr.—Mich. (2).
P. sitchensis Baxter—Alaska (2).
P. subacida (Pk.) Sacc.—Maine (1).
P. taxicola Pers. ex Bres.—Alaska, Great Lakes States (2).
P. tenuis (Schw.) Cke.—N.Y., Pa. (2).
P. tsugina (Murr.) Sacc. & Trott.—(2).
P. vaporaria (Pers. ex Fr.) Cke.—Widespread (2).
P. xantha (Fr.) Cke.—northwestern U.S. (2). *P. xantha* var. *crassa* Karst.—Alaska (2).

Pucciniastrum americanum (Farl.) Arth. (O,I), needle rust. Not collected on spruce in U.S. but II and III known on *Rubus* spp.
P. arcticum (Lagh.) Tranz. (*Peridermium ingenuum* Arth.) (O,I), needle rust. New England to S. Dak. (1). II and III on *Rubus* spp.
Pythium ultimum Trow, damping-off. Widespread (2).
Rhizoctonia solani Kuehn, damping-off. Cosmopolitan (2).
Schizophyllum commune Fr., wood rot. Occasional (2).

Stereum spp., typically on logs, stumps, and slash. Species reported include:
S. abietinum Pers. ex Fr.—N.Y. (2); *S. ambiguum* Pk.—Mont., N.Y., Tenn. (2); *S. chailletii* Pers. ex Fr.—N.Y. to Wash. (2); *S. radiatum* Pk.—Idaho, Mont. (2); *S. rugisporum* (Ell. & Ev.) Burt—Rocky Mountains (2); *S. sanguinolentum* Alb. & Schw. ex Fr., white pocket rot, sapwood rot. Widespread (2); *S. sulcatum* Burt—N.C. to Rocky Mountains and Pacific Northwest (2).

Thelephora terrestris Ehr. ex Fr. (*T. laciniata* Pers. ex Fr.), smothering of seedlings. Idaho, Ohio (2).

Trametes spp., wood rot of logs and timber. Species reported include:
T. americana Overh. (*T. odorata* Amer. Auct.)—Widespread (2); *T. heteromorpha* (Fr.) Lloyd—N.Y. to northern Rocky Mountains (2); *T. serialis* Fr. (*Poria callosa* (Fr.) Sacc.)—Widespread (2); *T. variiformis* Pk.—Alaska, Mont., N.Y., Pa. (2).

Pinus,[10] pine

I. Soft Pines, Five-Leaved

A. Eastern species

Pinus strobus L., eastern white pine.

Large evergreen tree of range 21,22,23,24,25, and 27; a hardy pine and ornamental; cultivated, zone 3; used extensively for lumber, boxes, and millwork products.

Aleurodiscus amorphus (Pers. ex Fr.) Rab., on bark of suppressed trees. Widespread.
Armillaria mellea Vahl ex Fr., root rot, collar resinosis. Widespread.
Atropellis pinicola Zeller & Goodding, canker. Oreg., ?Maine.
A. tingens Lohman & Cash—Va.
Bifusella linearis (Pk.) Hoehn., needle cast. New England to N.C. and Minn.
Botryosphaeria ribis Gross. & Dug., on branches, ?canker. Ga.
Caliciopsis pinea Pk., branch and trunk canker. New England to S.C. and Tenn.
Capnodium pini Berk. & Curt., on aphid secretions on needles and twigs. Widespread.
Cenangium ferruginosum Fr. (*C. abietis* (Pers.) Rehm), on twigs and branches, ?canker. New England to Ohio.
Coccophacidium pini (Alb. & Schw. ex Fr.) Rehm, on branches, ?canker. New England to Ga. and Mich.
Cronartium ribicola A.Fisch. (*Peridermium strobi* Kleb.) (O,I), white pine blister rust, with swellings on branches and trunks. New England to Va., N.C., Tenn., and Great Lakes States; Wash. II and III on *Grossularia* and *Ribes* spp.
Cucurbitaria pithyophila (Fr.) de N., on dead branches. Mich., Wash.
Cylindrocladium scoparium Morg., root and stem rot of seedlings. N.J.
Dasyscypha agassizii (Berk. & Curt.) Sacc., on blister rust cankers. New England to Mich.
D. ellisiana (Rehm) Sacc., on dead branches. New England to N.C.
D. pini (Brunch.) Hahn & Ayers, branch canker. Mich.
Diplodia megalospora Berk. & Curt., on twigs. N.Y.
D. pinea (Desm.) Kickx (*Sphaeropsis ellisii* Sacc.), secondary in bark cankers and dieback. On trees in unfavorable locations; collar rot of seedlings. N.J., N.Y., Wis.
Fomes annosus (Fr.) Cke., root and butt rot, white pocket rot. New England to Minn.; N.C.
F. applanatus (Pers. ex Fr.) Gill., white-mottled heart rot. N.Y.
F. officinalis (Vill. ex Fr.) Faull—Mich., ?Wis.
F. pini (Brot. ex Fr.) Karst., red ring rot, white pocket heart rot, resinosis. Widespread.
F. pinicola (Sw. ex Fr.) Cke., brown crumbly heart rot. Widespread.
F. roseus (Alb. & Schw. ex Fr.) Cke., brown cubical heart rot. Widespread.
Fracchiaea heterogenea Sacc.—Ga.
Fusarium spp., seedling root rot. Widespread.
Haplosporella pini Pk.—N.Y.

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[10] The *Pinus* spp. are arranged here in two divisions, viz., the soft pines and the hard pines. Under each of these divisions the species are grouped mainly by their geographical distribution. Under the hard-pine division there also is a section of disease reports on exotic species and another of reports in which the individual host species was not specified.

Disease reports on host species outside their normal growth range are reports on cultivated species.

The economic utilization of the *Pinus* spp. listed, especially their value to the lumber industry, will be noted in the description of the individual host species.

Hendersonia foliicola (Berk.) Fckl., on needles. D.C., Mass.
H. pini Fckl., on twigs. Pa.
Hendersonula pinicola Dearn., ?needle blight. N.C., Tenn.
Hypoderma desmazierii Duby (*H. brachysporum* (Rostr.) Tub.), needle cast. Maine to N.C., Ga., and Wis.
Lentinus lepideus Fr., brown cubical rot of timber, sometimes heart rot of living trees. Widespread.
Lenzites saepiaria Wulf. ex Fr., sapwood rot of logs and slash. General.
Leptothyrium stenosporum Dearn., on needles, ?blight. Ga.
Lophium mytilinum Pers. ex Fr., on twigs. Mich.
Lophodermium nitens Darker, needle cast. New England to Ga. and Mich.; Wash.
L. pinastri (Schrad. ex Fr.) Chev.—Widespread, Maine. Ga. Cause of severe needle cast in nursery trees in Ohio.
Nectria sp., trunk canker. Mich.
N. cucurbitula Tode ex Fr., on branches. New England to N.C.
Neopeckia coulteri (Pk.) Sacc., brown felt blight. Mont.
Ophionectria scolecospora Bref., on branches, ?canker. New England to N.C., Ga., and Iowa.
Orcadella operculata Wingate, myxomycete, on bark of living tree. Iowa.
Peniophora gigantea (Fr.) Mass., sapwood rot of logs, decay of slash. Widespread.
Peridermium strobi Kleb.: SEE *Cronartium ribicola*.
Pestalotia funerea Desm., on senescent needles. Widespread.
Pezicula livida (Berk. & Br.) Rehm, on branches. Iowa, N.C.
Phacidium infestans Karst., snow mold. Occasional in New England.
P. planum Davis, on needles. Wis.
Phoma bacteriophila Pk., ?stem canker of juvenile plants. N.Y.
P. harknessii Sacc., on twigs. New England.
Phomopsis conorum (Sacc.) Died., on twigs. Iowa.
P. strobi Syd., on branches associated with rust galls. Maine.
Physalospora obtusa (Schw.) Cke., on branches. N.Y.
Phytophthora cinnamomi Rands, root rot of seedlings. Md.
Polyporus abietinus Dicks. ex Fr., sapwood rot of standing trees, logs, and slash. General.
P. anceps Pk., white pocket heart rot. Mich., Vt.
P. berkeleyi Fr., butt rot. Minn.
P. circinatus Fr., root and butt rot, white pocket heart rot. Minn., N.C., N.Y.
P. schweinitzii Fr., reddish brown root and butt rot, resinosis. Widespread.
P. sulphureus Bull. ex Fr., brown cubical heart rot. Wis.
Poria subacida (Pk.) Sacc., white spongy root rot. New England.
Pythium ultimum Trow, damping-off. Cosmopolitan.
Rhabdospora mirabilissima (Pk.) Dearn. (*?R. pini* (Berk. & Curt.) Sacc.), stem canker of seedlings. N.Y.
Rhizoctonia solani Kuehn, damping-off. Cosmopolitan.
Scirrhia acicola (Dearn.) Siggers (*Systremma acicola* (Dearn.) Wolf & Barbour)—N.C. Conidial stage long known as *Septoria acicola* (Thuem.) Sacc.= *Lecanosticta acicola* (Thuem.) Syd.
Sclerophoma pityella (Sacc.) Hoehn.—N.Y., Pa.
Scoleconectria scolecospora (Bref.) Seaver: SEE *Ophionectria scolecospora*.
Scorias spongiosa (Schw.) Fr., snow mold. Ind.
Septobasidium pinicola Snell, on branches associated with scale insects. Maine to N.C.; Wis.
Septoria spadicea Patterson & Charles, needle blight, brown spot. N.H., N.Y., Vt.
Sphaeronema pithyum Sacc., on branches and trunks, ?dieback. N.Y.
Sphaeropsis malorum Pk. (*Physalospora obtusa* (Schw.) Cke.), on dead areas of branches and trunk.
Stereum sanguinolentum Alb. & Schw. ex Fr., sapwood rot, brown cubical heart rot. Widespread; mottled bark disease—Idaho.
Thelephora terrestris Ehr. ex Fr., seedling blight. Maine, N.H., Ohio.
?Tympanis buchsii (P.Henn.) Rehm, on dead branches. N.Y. According to Groves, this species occurs only on *Abies*.
T. confusa Nyl.—Conn., N.Y.
T. hypopodia Nyl.—Conn., Mass.
T. pinastri Auct. Amer., on injured or cankered areas of branches and trunk but not the cause of injury. Maine to Md., Pa.
Valsa collicula (Wormsk.) Cke.—N.Y., Pa.
V. pini Alb. Schw. ex Fr., on twigs and branches. Widespread.
CHLOROTIC DWARF—cause unknown. New England to Ky. and Mich.
FORKING—cause unknown. Wis.
NEEDLE BLIGHT—physiological. Md. (?northeastern U.S.).
RESINOSIS—associated with collar rot, heart rot, or cankers.

B. Western species

(1) *Pinus albicaulis* Engelm., whitebark pine. Range 1,4,12,13.
(2) *P. aristata* Engelm., hickory or bristlecone pine. Range 9,10,11,13,14; cultivated zone 5.
(3) *P. ayacahuite* Ehrenb. (*P. strobiformis* Engelm.), Mexican white pine. Range 11,14.
(4) *P. balfouriana* A.Murr., foxtail pine. Range 4.
(5) *P. flexilis* James, limber pine. Range 4,5, 11,12,13,14,15.
(6) *P. lambertiana* Dougl., sugar pine. Range 1,4,10.
(7) *P. monticola* Dougl., western, or mountain, white pine. Range 1,2,4.
(8) *P. torreyana* Carr., Torrey or Soledad pine: southern California coast.

Large, handsome, evergreen trees, except (2) usually bushy; economic value as lumber, millwork products, match planks, and boxes, especially (7).

Arceuthobium americanum Nutt. ex Engelm., mistletoe witches'-broom. Mont. (1,5).
A. campylopodum Engelm. f. *blumeri* (A. Nelson) Gill, western dwarf mistletoe. Northern and southern Rocky Mountain States to Pacific coast (3,6,7).
A. campylopodum Engelm. f. *cyanocarpum* (A.Nelson) Gill, western dwarf mistletoe. Northern and southern Rocky Mountain States to Pacific coast (1,2); occasional from Mont. to N. Mex., Calif., and Oreg. (5); Calif. (7).
Armillaria mellea Vahl ex Fr., root rot. Mont. (5); Calif. (6); Idaho, Oreg. (7).
Atropellis pinicola Zeller & Goodding, branch and trunk canker, bluish-black wood stain. Oreg. (1,6); Pacific Northwest, Idaho, Wash. (7).
A. piniphila (Weir) Lohman & Cash, canker. Pacific Northwest, Ariz., N. Mex., and in Ala. and Tenn. (1); Oreg.

Bifusella linearis (Pk.) Hoehn., tar spot, needle cast. Calif. (4); Colo., Mont., N. Mex. (5); Idaho, Oreg., Wash. (7).
B. striiformis Darker, needle cast. Calif. (8).
Cenangium ferruginosum Fr. (*C. abietis* Pers. ex Rehm), on twigs. Ariz. (5); Colo., Idaho (7).
Ceratostomella pilifera (Fr.) Wint., blue stain. Widespread; Idaho (7).
Coleosporium crowellii Cumm. (III), needle rust. Ariz., Colo., N. Mex. (5).
Cronartium ribicola A. Fisch. (*Peridermium strobi* Kleb.) (O,I), white pine blister rust, with swellings on branches and trunks. Idaho, Oreg., Wash. (1); N.Y. on cultivated specimens of (3); Iowa, Mass., Minn. (5); Calif., N.Y., Oreg. (6); Idaho, Oreg., Mass., N.Y., Wash. (7). II and III on *Grossularia* and *Ribes* spp. Within their natural stands, only *P. albicaulis, P. lambertiana,* and *P. monticola* are known to have become naturally infected with blister rust. *P. monticola* is the most commonly affected of these three species.
Cryptosporium lunasporum Linder, on living blister rust cankers. Idaho (7).
C. pinicola Linder, on living blister rust cankers. Idaho (7).
Dasyscypha agassizzi (Berk. & Curt.) Sacc., on bark, especially of blister rust cankers. Idaho (1,7), Oreg. (7). According to Ehrlich, the fungus on blister rust is not this species, but no other name is proposed.
D. arida (Phil.) Sacc., on twigs. Calif., Idaho (1); Mont. (5).
D. ellisiana (Rehm) Sacc., on twigs, ?canker. Mass. (5,7, cultivated).
D. pini (Brunch.) Hahn & Ayers, twig canker. Mont. to Wash. (7).
Dothiorella pinastri Linder, on live blister rust-cankered branch. Idaho (7).
Dothistroma pini Hulbary, needle blight. Ohio (7).
Fomes annosus (Fr.) Cke., root and butt rot, white pocket rot. Calif. (6); Idaho, Mont. (1,7).
F. nigrolimitatus (Rom.) Egel., white pocket rot. Idaho (7).
F. officinalis (Vill. ex Fr.) Faull, brown cubical rot. Pacific Northwest, Calif. (6); Idaho (7).
F. pini (Brot. ex Fr.) Karst., red ring rot, white pocket rot. Widespread, Idaho, Mont. (1,7); Ariz. (3); Mont. (5); Calif. (6).
F. pinicola (Sw. ex Fr.) Cke., brown cubical rot. Widespread (1,7); Colo. (2); Ariz. (3); Mont. (5); Calif. (6).
F. roseus (Alb. & Schw. ex Fr.) Cke., brown cubical rot, top rot. Ariz. (3); widespread (6); Wash. (7).
F. subroseus (Weir) Overh.—Mont. (7).
Haplosporella sp.—Mont. (4).
Herpotrichia nigra Hartig, brown felt blight. Northern Rocky Mountains to Pacific coast; Idaho (1,7).
Hypoderma saccatum Darker—Colo. (5).
Hypodermella sp., needle cast. Mont., Wash. (7).
H. arcuata Darker, needle cast, tar spot. Calif., Oreg. (6).
Lentinus lepideus Fr., sapwood and sometimes heart rot of living trees. Calif. (1); Idaho (7).
Lenzites saepiaria Wulf. ex Fr.—Wash. (1).
Lophodermium sp.—Calif. (8).
L. durilabrum Darker, needle cast. Oreg.
L. nitens Darker—Calif. to Idaho and Wash. (1,7); Calif., Oreg. (6).
L. pinastri (Schrad. ex Fr.) Chev., needle cast. Northern Rocky Mountains to Pacific coast, also Mass. and Ohio (1,7); Mont. (4).
Neofuckelia pinicola Zeller & Goodding, on branches with *Atropellis* cankers. Idaho, Oreg., Wash. (5).
Neopeckia coulteri (Pk.) Sacc., brown felt blight. Northern Rocky Mountains to Pacific coast (1,7); Calif. (4,5); Mont. (5).
Peniophora subincarnata (Pk.) Litsch.—Wash. (7).
Peridermium strobi Kleb.: See *Cronartium ribicola.*
Phacidium planum J.J.Davis, needle blight. Colo. (5).
Pholiota adiposa Fr., heart rot, sometimes of living trees. Idaho, Mont.
Phoma acicola (Lév.) Sacc., on senescent needles. Idaho (7).
P. harknessii Sacc.—Calif. (1,6).
P. pinicola (Zopf) Sacc., on senescent needles. Colo. (5), Idaho (7).
Polyporus anceps Pk. (*P. ellisianus* (Murr.) Sacc. & Trott.), red ray rot, white pocket rot. Idaho (7).
P. circinatus Fr., root and butt rot, white pocket rot. Idaho (7).
P. schweinitzii Fr., reddish brown root and butt rot. Colo. (2,4); national forests in the U. S. (3); widespread (5,6); Mont. (1,7); Idaho (7).
P. sulphureus Bull. ex Fr., brown cubical rot. Occasional.
P. versicolor L. ex Fr.—Mont. (7).
Poria albobrunnea Rom., brown wood rot. Idaho (7).
P. subacida (Pk.) Sacc., white spongy root rot. Idaho (7).
P. vaporaria Fr., dry cubical brown rot of logs. Calif., Oreg. (6).
Rhizina undulata Fr., seedling blight. Idaho, Mont. (7).
Rosellinia helena (Fr.) Rab., on roots. Idaho (7).
Scopularia ? serpens Goid., isolated from "pole blight," perhaps infects bark and wood (blue stain). Idaho, Mont., Wash. (7).
Septobasidium pinicola Snell, on branches. Idaho.
Sparassis radicata Weir, yellow-mottled root rot. Mont. to Oreg. and Wash. (7).
Stereum sanguinolentum Alb. & Schw. ex Fr., mottled bark, sapwood rot, white pocket rot. Idaho (7).
Thelephora terrestris Ehr. ex Fr., seedling blight. Wash. (7).
Trametes spp., wood rot of logs and timber. Reports include:
T. americana Overh.—Occasional.
T. serialis Fr. (*Poria callosa* (Fr.) Sacc.)—Mont. (7).
T. tenuis Karst. (*T. isabellina* Fr., *Poria isabellina* (Fr.) Overh.), white sapwood rot. Mont. (1,7).
T. variiformis Pk.—Idaho (7).
Tuberculina maxima Rostr., on *Cronartium ribicola* cankers. Wash. (7).
Tympanis buchsii (P.Henn.) Rehm, branch canker. Idaho (7). According to Groves, this sp. occurs only on *Abies.*
T. hypopodia Nyl., on blister rust cankers. Idaho (7).
T. pinastri Auct. Amer.—Calif., Idaho (1,7).

II. Hard Pines, Two- and Three-Leaved

A. Northeastern species

(1) *Pinus banksiana* Lamb., jack pine, Norway pine. Range 23,24,26,27; cultivated, zone 2.
(2) *P. pungens* Lamb., Table Mountain pine. Range 25,27.
(3) *P. resinosa* Ait., red pine. Range 23,24, 26,27; cultivated, zone 2.
(4) *P. rigida* Mill., pitch pine. Range 26,27.
(5) *P. rigida* var. *serotina* (Michx.) Loud., pond pine. Range 28,29,30.

Tall evergreen trees, except (1) sometimes shrubby; hardy and ornamental; (1) used for pulpwood, box lumber, and fuel; (3) used prin-

cipally for lumber and millwork products, also for woodenware, ties, and posts.

Armillaria mellea Vahl ex Fr., root rot, collar resinosis. Mich., Minn. (1); Minn. (3); Pa. (4).

Atropellis piniphila (Weir) Lohman & Cash, canker. S. Dak. (1).

A. tingens Lohman & Cash, canker. N.C. (1,2,4); Pa. (1,4); Mass., N.H. (3); Va. (4).

Caliciopsis pinea Pk., on branches, ?canker. N.C., N.J. (4).

Cenangium atropurpureum Cash & Davidson, on twigs. Md. (2,4).

C. ferruginosum Fr., twig blight. N.Y., Pa. (3).

Ceratostomella spp., blue stain. Widespread. Chiefly, *C. ips* Rumbold—Minn., Pa. (3); *C. pilifera* (Fr.) Wint.—Pa. (4); and *C. pini* Münch, which also causes tracheomycosis in N.C. and Va.

Coleosporium campanulae (Pers.) Lév. (O,I), needle rust. Conn. to Nebr. (1); Mich., N.H., N.Y. (3); N.H. to N.C. and Ohio (4). II and III on *Campanula, Specularia,* and *Lysimachia.*

C. delicatulum Hedgc. & Long (O,I), needle rust. N.H. to Fla. (2); Vt. (3); New England to Fla., west to Great Plains (3,4,5). II and III on *Solidago* (*Euthamia*) spp.

C. elephantopodis (Schw.) Thuem. (O,I), needle rust. Md. to Fla. and Tenn. (4); N.J. to Fla., Tex., and Ill. (5). II and III on *Elephantopus* spp.

C. helianthi (Schw.) Arth. (O,I), needle rust. Conn. to Nebr. (1).

C. ipomoeae (Schw.) Burr. (O,I), needle rust. Pa. to Fla. and Ala. (4); N.J. to Fla., Ill. (5). II and III on *Ipomoea* spp. and other Convolvulaceae.

C. laciniariae Arth. (O,I), needle rust. Md., N.J. to Fla. (4).

C. pinicola Arth. (III), needle rust. Mass. (4).

C. solidaginis (Schw.) Thuem. (O,I), needle rust. Conn. to Nebr. (1); Maine to N.J. and Minn. (3); Maine to S.C. and Ohio (4).

C. sonchi-arvensis (Pers.) Lév. (O,I), needle rust. Conn. to Nebr. (1).

C. terebinthinaceae (Schw.) Arth. (O,I), needle rust. N.C., S.C. (4); Southeastern States (5). II and III on *Parthenium* and *Silphium.*

C. vernoniae Berk. & Curt., needle rust. Conn. to Fla., Ky., and Ill. (4).

Cronartium comandrae Pk. (O,I), Comandra blister rust. Mich., Minn., Wis., Eastern States (1); Pa., Eastern States (2); Vt. (3,4); Conn., N.J. (4).

C. comptoniae Arth. (O,I), sweetfern blister rust. Maine to N.J. and Minn. (1); Maine to N.Y., also Minn. (3); Maine to Md. (4).

C. quercuum (Berk.) Miy. (O,I), eastern gall rust. Conn., Mich., Minn., Wis. (1); Tenn. (2); Minn., N.J. (3); Mass. to N.J., Ky., and Tenn. (4).

Cylindrocladium scoparium Morg., seedling blight, seedling rot. N.J., Pa. (3); N.J. (4).

Dasyscypha calyciformis (Willd.) Rehm—Mich. (1).

D. ellisiana (Rehm) Sacc., on twigs. Conn., Mass., R.I. (1); N.C. (2); New England (3); Maine to N.C. and W. Va. (4).

D. oblongospora Hahn & Ayers—Pa. (2).

Dematium pullulans d By.: SEE *Pullularia pullulans.*

Diplodia pinea (Desm.) Kickx. (*Sphaeropsis ellisii* Sacc.), tip blight, twig blight, seedling blight. Md., N.J., Pa., Wis. (3); Mass. (4).

Dothistroma pini Hulbary, needle blight. Ohio (3).

Fomes annosus (Fr.) Cke., root and butt rot, white pocket rot. General (1); New England, Minn. (3); New England, N.C. (4).

F. pini (Brot. ex Fr.) Karst., red ring rot, white pocket rot, resinosis. General (1); widespread (3,4).

F. pinicola (Sw. ex Fr.) Cke., brown crumbly heart rot. General (1); widespread (3,4).

F. roseus (Alb. & Schw. ex Fr.) Cke., butt and heartwood rot. General (1).

F. subroseus (Weir) Overh., brown cubical top rot. Occasional (4).

Fusarium spp., preemergence and postemergence seedling blight. Pa. (3). Species reported: *F. avenaceum* (Fr.) Sacc. and *F. oxysporum* Schlecht.

Hypoderma desmazierii Duby, needle cast. N.Y. (3); Conn. to N.H. and N.Y. (4).

H. hedgcockii Darker, needle cast. N.C. (4).

H. lethale Dearn., needle cast. N.Y. (3); Maine to S.C. and Miss. (4); Fla., S.C. (5).

Hypodermella ampla (J.J.Davis) Dearn., tar spot, needle cast. Great Lakes States (1).

Lentinus lepideus Fr., root and butt rot. Minn. (1).

Lophodermium pinastri (Schrad. ex Fr.) Chev., needle cast. Great Lakes States (1); widespread (3); Maine to Va., W.Va., Ga. (4).

Nectria cucurbitula Tode ex Fr., on moribund branches, ?parasitic. Wis. (1); N.J. (4); burn blight. Wis. (3).

Neopeckia coulteri (Pk.) Sacc., brown felt blight. N.Y.

Ophionectria scolecospora Bref., on branches, ?canker. Pa.

Peridermium. For species having known telial stages, see *Coleosporium* and *Cronartium.*

Pestalotia funerea Desm., seedling root rot. Md., Tex. (3).

Pezizella minuta Dearn., on needles. N.C. (4).

Phacidium convexum Dearn., on needles. N.C. (4).

Phaeocryptopus pinastri (Ell. & Sacc.) Petr., on dead needles. N.J. (4).

Phytophthora cactorum (Leb. & Cohn) Schroet., seedling root rot. Minn. (3).

P. cinnamomi Rands, root rot of seedlings. Del., Md. (3).

Polyporus amorphus Fr., brown stringy rot of trunks and logs. ?New England (2), Pa. (4).

P. anceps Pk., red ray rot, white pocket rot. Mich. (1); Minn., N.H. (3).

P. circinatus Fr., root and butt rot, white pocket heart rot. General (1), Minn. (3), Pa. (4).

P. schweinitzii Fr., reddish brown root and butt rot. General (1), widespread (3).

P. sulphureus Bull. ex Fr., brown checked butt and heart rot. Minn. (3).

P. volvatus Pk., white pocket rot. Mich., Minn. (3); Mass., N.Y., Vt. (4).

Poria subacida (Pk.) Sacc., white spongy root rot. Great Lakes States (3).

Pullularia pullulans (d By.) Berkhout, needle blight following insect injury (gall midge, Cecidomyiidae), also associated with "forking disease" (ibid.). New England (3). Conidial stage of *Anthostomella pullulans* Bennett.

Pythium irregulare Buism.—Wis. (3).

P. ultimum Trow, damping-off. Cosmopolitan (3).

Rhizina undulata Fr., seedling blight. Minn. (1), Md. (3). Commonly cited in the pathological literature as *R. inflata* (Schaeff.) Karst.

Rhizoctonia solani Kuehn, damping-off. Cosmopolitan (3).

Scirrhia acicola (Dearn.) Siggers (*Systremma acicola* (Dearn.) Wolf. & Barbour), brown needle spot. La., N.C., and Tenn. (4); La. (5). Conidial stage long known as *Septoria acicola* (Thuem.) Sacc.= *Lecanosticta acicola* (Thuem.) Syd. (U. S. Dept. Agr. Tech. Bul. 870).

Septobasidium linderi Couch and *S. pinicola* Snell, on branches infested by scale insects. Mass. (4).

Thelephora terrestris (Ehr.) Fr., on seedlings. Mich. (1).

Tubercullariella ips Leach, Orr, & Christensen, blue stain. Minn. (3).

Tympanis sp., trunk canker. New England to Mich.

and Ohio (3). Frequently reported as *T. pinastri* Auct. Amer.

Valsa superficialis Nits., branch canker. Mich. (1).

BURN BLIGHT—caused by *Chilonectria cucurbitula* (Tode) Sacc. following spittle bug (*Aphrophora saratogensis* Fitch) injury, usually on poor sites. Wis. (1,3).

FORKING (proliferation of lateral buds), ?FASCIATION—cause unknown. ?Mechanical, ?environmental, or ?pathogenic injury. Conn., N.Y., Pa., Wis. (3). *Dematium pullulans* and *Tympanis* sp. associated but not proved as cause.

RESINOSIS (abnormal exudation of resin)—associated with collar rot, heart rot, and various cankers. Occasional (3).

SYMBIOTIC REVERSAL—reversal of symbiosis in mycorrhizal fungus. Ga. (4).

WITCHES'-BROOM—cause unknown. Fla. (?5).

B. Eastern to southern species

(1) *Pinus caribaea* Morel., slash pine. Range 30,31,32 and the West Indies.

(2) *P. clausa* (Engelm.) Vasey, sand pine. Range 30.

(3) *P. echinata* Mill., shortleaf pine. Range 20,25,27,28,29,30.

(4) *P. glabra* Walt., spruce pine. Range 29 and 30.

(5) *P. palustris* Mill., longleaf pine. Range 28,29,30.

(6) *P. taeda* L., loblolly pine. Range 19,20,22, 25,28,29,30.

(7) *P. virginiana* Mill., Virginia pine. Range 25,27,28,29.

Large trees (5,7) and hard pines of intermediate needle length (3,4,6): (1) and (5) used in factory, warehouse, bridge, and dock construction as beams, posts, joists, and for flooring; (3) and (6) used for interior building material, boxes and crates, and low-grade furniture; (5) and (6) important timber trees, (5) yielding excellent resin. Southern pines are used for railway ties, mine timbers, and telegraph and telephone poles.

Aphelenchoides fragariae (Ritz.-Bos) Christie, in roots. Fla. (5).

Arceuthobium campylopodum Engelm., dwarf mistletoe. Tex. (1).

Atropellis apiculata Lohman, Cash, & Davidson, twig canker. N.C., Va.

A. piniphila (Weir) Lohman & Cash, canker. Ala. (6).

A. tingens Lohman & Cash, twig and branch canker. Ga. (1,6,7), Va. (6).

Caliciopsis pinea Pk., on branches. N.C. (7).

Cenangium atropurpureum Cash & Davidson, on dead twigs. Ga. (1,6), S.C. (1), Md. (7).

C. ferruginosum Fr., on twigs. Ga. (3); Ala., Ga., N.C. (6); Md., Va. (7).

Ceratostomella ips Rumbold, blue stain. SEE ALSO *Diplodia pinea.*

C. pilifera (Fr.) Wint., blue stain.

C. pini Münch, blue stain and tracheomycosis following bark beetle injury. Southern States (3); Ga. (6); N.C., Va.

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1,2).

Coleosporium apocynaceum Cke. (O,I), needle rust. Southeastern States (1,5); specific reports—Ala., Fla., Tex. (1); Fla., Ga. (5); Fla. 6. II and III on *Amsonia* spp.

C. campanulae (Pers.) Lév. (O,I), needle rust. New England to Ind. and N.C. (7). II and III on *Campanula, Specularia,* and *Lysimachia.*

C. delicatulum Hedgc. & Long (O,I), needle rust. New England to Fla., west to Great Plains (1,3,5,6). II and III on *Solidago* (*Euthamia*) spp.

C. elephantopodis (Schw.) Thuem. (O.I.), needle rust. N.J., to Fla., Tex., and Ill. (1,3,5,6). II and III on *Elephantopus* spp.

C. helianthi (Schw.) Arth. (O,I), needle rust. N.Y. to Ga. and Ohio (3,7). II and III on *Helianthus* spp.

C. heterotheca Hedgc. (=?*C. solidaginis* (Schw.) Thuem.) (O,I), needle rust. Fla. (5). II and III on *Heterotheca subaxillaris* (Lam.) Britt. & Rusby.

C. inconspicuum Hedgc. & Long (O,I), needle rust. Md. to Ga., Tenn., and Ohio (3,5,7). II and III on *Coreopsis* spp.

C. ipomoeae (Schw.) Burr. (O,I), needle rust. N.J. to Fla., Ill., and Ariz. (1,3,5,6). II and III on *Ipomoea* spp. and other Convolvulaceae.

C. laciniariae Arth. (O,I), needle rust. N.J. to Fla. (5,6). II and III on *Liatris* spp.

C. minutum Hedgc. & Hunt (O,I), needle rust. Fla. (4,6). II and III on *Forestiera ligustrina* (Michx.) Poir.

C. pinicola Arth. (III), needle rust. Md. (6); Del. to N.C., Tenn., and Ind. (7).

C. solidaginis (Schw.) Thuem. (O,I), needle rust. N.J. to Ala. and Ark (3); Ala., Miss. (5); N.J. to Ala. (6); Pa., Tenn., Va. (7).

C. terebinthinaceae (Schw.) Arth. (O,I), needle rust. Southeastern States (3,6,7); specific reports—S.C. (5,7); Ala., S.C. (6). II and III on *Parthenium* and *Silphium.*

C. vernoniae Berk. & Curt. (*C. carneum* Jacks.) (O,I), needle rust. N.C. to Fla. and La., also Ky., Miss., Tex. (1 5); Fla. (2,4); Md. to Fla., Tex., and Kans. (3,6); N.J. (6).

Criconemoides rusticum (Micoletzky) Taylor, rootlet necrosis. Ga. (3).

Cronartium cerebrum Hedgc. & Long (=?*C. quercuum* (Berk.) Miy.) (O,I), gall rust. Tex. (1,5).

C. comptoniae Arth. (O,I), sweetfern blister rust. N.J. to Ga. and ?Mich. (6); Md., N.J., Pa. (7).

C. fusiforme Hedgc. & Hunt (O,I), southern fusiform rust, with swellings on branches and trunks. Southern States (1,6); N.C. to Fla. and Tex., especially in Ala. and Miss. (5). II and III on evergreen *Quercus* spp.

C. quercuum (Berk.) Miy. (O,I), eastern gall rust. Fla. (2); Va. to Fla. and Ark. (3,6); general (7).

C. strobilinum Hedgc. & Hahn (O,I), cone rust, causes hypertrophy of cones. Fla., Miss. (1,5). II and III on evergreen *Quercus* spp. SEE ALSO *C. quercuum.*

Dacryomyces sp., sapwood stain and tracheomycosis. N.C. (3).

Dasyscypha ellisiana (Rehm) Sacc., on twigs and branches. Ga., N.C. (3); Del., Ga., La., N.J. (6); Md., Pa., Va. (7).

D. oblongospora Hahn & Ayers—Maine to Pa. and Mich. (7).

Dermatea pini Phill. & Harkn., on branches. Va. (7).

Diplodia megalospora Berk. & Curt., on branches, twigs, and roots, ?canker, ?wood stain. Gulf States (6), Va. (7).

D. natalensis P.Evans, blue wood stain. Gulf States. *D. natalensis* P.Evans: SEE *Diplodia pinea.*

D. pinea (Desm.) Kickx (*Sphaeropsis ellisii* Sacc.), dieback. Pa. (7).

D. pinea (Desm.) Kickx, *Gloeotulasnella pinicola* (Bres.) Rogers, and *Ceratostomella ips* Rumbold, pitch-soak and dry-face in wounds simulating those of turpentine extraction (1) *Diplodia natalensis* may also be involved; other tested fungi are secondary.

Elytroderma deformans (Weir) Darker, needle cast. Ga. (3).
Fomes annosus (Fr.) Cke., root and butt rot. Widespread (5); Md., Va. (7).
F. calkinsii (Murr.) Sacc. & Trott. (*F. robustus* Karst.—La.
F. pini (Brot. ex Fr.) Karst., red ring rot, white pocket heart rot. Fla. (2); N.J. to Fla. and Tenn. (7).
F. pinicola (Sw. ex Fr.) Cke., brown crumbly heart rot. Pa. to N.C. and Tenn. (7).
F. roseus (Alb. & Schw. ex Fr.) Cke. and *F. subroseus* (Weir) Overh., brown cubical heart rot. Md., Va. (7).
Fracchiaea ?heterogenea Sacc.—Ga. (6).
Fusarium spp., seedling root rot. Ga., S.C. (1); Ga. (5).
F. lateritium Nees f. *pini* Hepting, pitch pine canker. N.C., Va.
Geotrichum sp., pink wood stain. Southern States (3).
Gloeotulasnella pinicola (Bres.) Rogers. SEE *Diplodia pinea.*
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Hypoderma hedgcockii Dearn., needle blight. N.C. (1); Fla. (1,2,5); Miss., N.C., Va. (3); Md. to Fla., Miss., and Tenn. (7).
H. lethale Dearn., gray needle blight. Fla. (1,2); Miss. (1); Va. to Fla., La. (3); Va. to Fla. (6); Md. to Fla. and Tenn. (7).
Hypodermella sp., needle cast. Ohio (7).
Hysterographium nova-caesariense (Ell.) Roum., on living bark. N.J. (7).
Irenina (*Meliola*) *pinicola* (Dearn.) F.L.Stevens, black mildew. N.C. (3).
Karschia sp. and *K. lignyota* (Fr.) Sacc.—Ga. (3).
Lophodermium pinastri (Schrad. ex Fr.) Chev., needle cast. Fla., Ga., Miss. (1); Southern States (3,4); Md. to Fla. and Miss. (6); Ga., Md., Pa., Va. (7).
Meloidogyne sp., root knot nematodes. (1)
Monochaetia pinicola Dearn., on needles. Fla. (5).
Nectria cucurbitula Tode ex Fr.—Ga. (6).
Ophionectria scolecospora Bref., on branches. Md., Va. (7).
Peridermium floridanum Hedgc. & Hunt (O,I), needle rust. Fla. (5). II and III unknown, *Liatris scariosa* (L.) Willd. suspected.
P. guatemalense Arth. & Kern, needle rust (O,I). Fla. (5).
Peridermium. For species having known telial stages, see *Coleosporium* and *Cronartium.*
Pestalotia funerea Desm., on needles. Widespread.
Pezizella lythri (Cke. & Ell.) Sacc., on twigs. Va. (7).
P. minuta Dearn., on needles. N.C. (3,6,7), Ga. (6).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Physalospora obtusa (Schw.) Cke.—Ga. (7).
Phytophthora cinnamomi Rands, rootlet necrosis. Presence associated with occurrence of little leaf, q.v.
Polyporus amorphus Fr.—Miss. (3), S.C. (6).
P. anceps Pk., red ray rot. Miss. (6).
P. palustris Berk. & Curt., brown cubical heart rot. Ga. (3,6); La.
P. schweinitzii Fr., reddish brown root and butt rot. Occasional (5); Md., Va. (7).
P. volvatus Pk., sapwood or occasionally white pocket heart rot. Ala. (6); Md., Va. (7).
Poria cocos Wolf, on roots. Fla.
P. subacida (Pk.) Sacc., white spongy rot. Md., Va. (7).
Rhizopogon parasiticus Coker & Totten, parasitic ectotrophic mycorrhiza. N.C. (3,6).
Scirrhia acicola (Dearn.) Siggers (*Systremma acicola* (Dearn.) Wolf & Barbour), brown needle spot. Fla., Ga., La., Miss., S.C., Tex. (1); Ala., La. (3); Fla. (4); N.C. to Fla. and Tex. (5); N.C. and Tenn. to Fla. and Tex. (6); Ga., N.C. (7). The conidial stage, long known as *Septoria acicola* (Thuem.) Sacc., is *Lecanosticta acicola* (Thuem.) Syd. (U.S. Dept. Agr. Tech. Bul. 870).
Septoria pinicola Dearn. (*?S. spadicea* Patterson & Charles), needle blight. Va. (7).
Stilbospora pinicola Berk. & Curt., on needles. Miss. (5).
Trametes americana Overh., wood rot. Md., Pa., Va. (7).
T. serialis Fr. (*Poria callosa* (Fr.) Sacc.), wood rot. La. (6); Md., Pa., Va. (7).
Tympanis ?pinastri Auct. Am., on branches. Va. (7).
Valsa pini Alb. & Schw. ex Fr., on twigs. Va. (7).
LITTLE LEAF—cause unknown. Va. to Ala., Miss., Tex. (3,4,5,6). Thought to be caused by nitrogen deficiency induced by killing of the feeding roots; prevalent especially in soils having poor internal drainage. Also, W.A.Campbell (Phytopath. 39:752 showed a correlation between the presence of *Phytophthora cinnamomi* Rands on *P. echinata* and the little leaf disease in Georgia. This fungus is associated with a necrosis of fine roots and subsequent dying of the secondary rootlets, which usually accompanies the disease.
NEEDLE CURL—physiological, attributed to water deficit after transplanting. Ga. (1,3).
SYMBIOTIC REVERSAL—reversal of symbiosis in mycorrhizal fungi; ?related to foliar decline diseases. Ga. (3,6,7). (Cf. Science 105:291).
WITCHES'-BROOM—cause unknown. Fla. (2).

C. Western species

(1) *Pinus attenuata* Lemm., knobcone pine. Range 4 and 10.
(2) *P. contorta* Loud., shore pine. Range 1.
(3) *P. contorta* var. *latifolia* Engelm. (*P. murrayana* Grev. & Balf.), lodgepole pine. Range 2,4,10,12,13,14,15.
(4) *P. coulteri* D. Don, Coulter pine.
(5) *P. jeffreyi* A. Murr., Jeffrey pine. Range 4.
(6) *P. muricata* D. Don, Bishop pine. Range 1,5.
(7) *P. ponderosa* Laws., western yellow pine. Range 4.
(8) *P. ponderosa* var. *arizonica* (Engelm.) Shaw, Arizona pine. Range 11,14.
(9) *P. ponderosa* var. *scopulorum* Engelm. (*P. brachyptera* Engelm.), Rocky Mountain yellow pine. Range 4,9,11,12,13,14,15.
(10) *P. radiata* D. Don, Monterey pine. Range 1,5.
(11) *P. sabiniana* Dougl., digger pine. Range 1.

Large, except (1), to massive (3,5,7) trees; furnish lumber, mine timbers, poles, and posts (3,7).

Arceuthobium americanum Nutt., dwarf mistletoe. Oreg. (1); Calif., Idaho, Mont., Oreg. (2,7); Rocky Mountain States, Pacific Northwest (3); Calif., Oreg. (5); Utah (7).
A. campylopodum Engelm. f. *typicum* Gill, western dwarf mistletoe. Northern and southern Rocky Mountain States to Pacific coast (1,2,4,5,7,10,11). Occurrence on (1,2) rare.
A. vaginatum (Willd.) Presl, southwestern dwarf mistletoe. Southern Rocky Mountain States (8).
A. vaginatum f. *cryptopodum* (Engelm.) Gill, dwarf mistletoe. Wash. (7); Ariz., Colo., N.Mex., Tex., Utah (7,9).
Armillaria mellea Vahl ex Fr., root rot. Idaho (3); Calif. (5); Mont. to Oreg. and Wash. (7).

Armillaria ponderosa (Pk.) Sacc., ectotrophic mycorrhiza. Oreg., Wash. (2).

Atropellis arizonica Lohman & Cash, branch and trunk canker, bluish-black wood stain. Ariz. (7).

A. pinicola Zeller & Goodding, branch canker. Oreg. (2,3), Pacific Northwest (2).

A. piniphila (Weir) Lohman & Cash, branch and trunk canker. Pacific Northwest, Ariz., N.Mex.; Ala. and Tenn. (cultivated) (2,7); Idaho, Mont., Wash. (3); Mont. (7).

Bifusella linearis (Pk.) Hoehn., needle cast. Colo. (3).

B. striiformis Darker, needle cast, tar spot. Calif. (4,11).

Cenangium alpinum Ell. & Ev.—Colo. (3).

C. ferruginosum Fr. (*C. abietis* (Pers. ex Fr.) Rehm), on branches and twigs, "pruning twig blight." Colo. to Mont. and Wash. (3); Calif., Oreg. (5); widespread (7); Calif. (11).

C. purpureum (Hedw.) Sacc.—Idaho (3).

Ceratostomella ips Rumbold—Oreg., N.Mex. (7).

C. pilifera (Fr.) Wint., blue stain (chiefly of timber). Calif., Wyo. (7).

C. pini Münch, blue stain of logs. Idaho, Oreg. (7); tracheomycosis associated with bark beetle injury in S. Dak. (?).

Coleosporium sp. (O,I), needle rust. Idaho, Mont., Wash. (3). Connection with *C. occidentale* Arth., (II,III) on *Senecio*, indicated but not proved.

C. madiae Cke. (O,I), needle rust. Oreg. (5), Calif. (10). II and III on various Compositae.

C. solidaginis (Schw.) Thuem. (O,I), needle rust. Western form is sometimes distinguished from the eastern form and known in the aecial stage as *Peridermium montanum* Arth. & Kern. Colo. to Mont. and Wash. (3); reported in the West (7); Mont. (9); On cultivated specimens—N.C.,N.J. (3); Md., Mich., N.J. (7). II and III on various Compositae, commonly *Aster* and *Solidago* spp.

C. vernoniae Berk. & Curt. (O,I), needle rust. Kans. (3); on cultivated specimens—N.C. (3); Ohio (7).

Coniophora corrugis Burt, sapwood rot, sometimes on living trees. Ariz., Colo., Wyo. (7).

Coryneum cinereum Dearn., on senescent needles. Colo. (3).

Cronartium coleosporioides (Diet. & Holw.) Arth. (O,I), lodgepole pine blister rust, with swellings on twigs and branches and trunk cankers. Northern and southern Rocky Mountains, Sierra Nevada Mountains, and high plateaus throughout the West, also Alaska (2,5,7); Calif. (4,11). II and III on *Castilleja, Cordylanthus, Orthocarpus,* and *Pedicularis.*

C. coleosporioides (=?*C. filamentosum* (Pk.) Hedgc., syn. *C. stalactiforme* Arth. & Kern) (O,I), western fusiform rust. Calif. to Alaska and widespread (3); Calif., Nev., Oreg. (5); S.Dak., Nebr., and northern and southern Rocky Mountain States to Calif. and Wash. (7,9).

C. comandrae Pk. (O,I), Comandra blister rust, with swellings on twigs and trunks. Oreg. (1,5); Colo. to Mont. and Idaho (3); Rocky Mountain States to Calif. and Wash. (2,7,8); Colo. (9).

C. comptoniae Arth. (O,I), sweet-fern blister rust, with swellings on branches and trunks. Calif. (2,3,7); Wash. (3); Mont. (7); on cultivated specimens—New England (3); N.H. (4); New England to Great Lakes States (7). II and III on *Comptonia peregrina* (L.) Coult. and *Myrica gale* L.

C. harknessii Meinecke (?O or O rarely, I), western gall rust, with galls on branches and trunks, also witches'-broom. Throughout the mountain regions of the West (2,5,7,11); northern Rocky Mountains to California and Wash. (3,7,9); Calif. (4); Calif., Nev., Oreg., Wash. (5); Calif., Wash. (11). II and III on *Castilleja* or omitted, with I repeating on pines. A different variety or species, provisionally named *Peridermium cerebroides* Meinecke, occurs on (1,10) in the coastal parts of Calif.; no alternate stage is known, I (and rarely O) repeating on pines. Both have been considered to be forms of *C. coleosporioides* and *C. cerebrum* Hedgc. & Long (=*C. quercuum* (Berk.) Miy.) They are segregated here because of their distinctive pathological effects.

C. quercuum (Berk.) Miy. (O,I), pine-oak gall rust. Ariz., Idaho, Nebr., S.Dak., Wash. (7); Calif. (7,10)); Nebr., Wyo. (9); on cultivated specimens—Conn. and Pa. (7). Reports of this rust on Pacific coast pines are doubtful and may pertain to the aecial stage of other *Cronartium* spp.; it occurs, however, on *Quercus* spp. in Ariz. and Calif.

Cunninghamella meinekella Olson, root necrosis and gummosis. Calif. (5,7). =*Fomes annosus* (Fr.) Cke. according to Wagener.

Dasyscypha ellisiana (Rehm) Sacc., twig canker. Mass. (7)—cultivated.

Diplodia pinea (Desm.) Kickx (*Sphaeropsis ellisii* Sacc.), tip blight. N.Y. (7).

Discosia pini Heald, on seedlings (?saprophytic). Nebr. (7).

Elytroderma deformans (Weir) Darker, needle cast. Calif., Mont., Oreg. (2); Mont. to Oreg. (3); Calif. (5); S.Dak. to Ariz., Calif., and Wash. (7); S.Dak. (9). Severe in eastern Oreg., Idaho, and northern Calif.

Fomes annosus (Fr.) Cke., butt and root rot, white pocket rot of trunks and logs. General in the range of the host (3); Calif. (4,5,7); northern Rocky Mountains, N.Mex., and Utah. (7).

F. nigrolimitatus (Rom.) Egel., white pocket rot. Mont. to Wash. (7).

F. officinalis (Vill. ex Fr.) Faull, brown cubical rot of trunks and logs. General in the range of the host (3); widespread (7); Colo. (3,7).

F. pini (Brot. ex Fr.) Karst., red ring rot, white pocket rot of standing trees and logs. Colo., Idaho, Mont., Oreg. (3); widespread (7).

F. pinicola (Sw. ex Fr.) Cke., brown crumbly rot. Idaho, Mont. (3); widespread (5,7,8).

F. roseus (Alb. & Schw. ex Fr.) Cke., brown cubical rot of trunks and logs. Mont. (3), widespread (7,8).

F. subroseus (Weir) Overh., brown cubical rot of trunks and logs. Colo., Idaho (3); widespread (7,8).

Fusarium spp., seedling root rot. Widespread (7).

F. oxysporum Schlecht. var. *aurantiacum* (Lk.) Wr., seedling blight. Calif. (5).

Hendersonia pinicola Wehm., on living needles. Wyo. (3).

Herpotrichia nigra Hartig, brown felt blight. Northern Rocky Mountains (3).

Hypoderma pedatum Darker, needle cast, tar spot. Calif. (10).

Hypodermella cerina Darker, needle cast, tar spot. Calif. (2,7).

H. concolor (Dearn.) Darker, needle cast, tar spot. Colo. to Idaho and Mont. (2); Colo. to Mont. and Oreg. (3).

H. lacrimiformis Darker, needle cast, tar spot. Calif. and Oreg. (1).

H. limitata Darker, needle cast, tar spot. Calif. (10).

H. medusa Dearn., needle cast, tar spot. Calif., Colo. (2,7); Colo. (3); Calif. (5,9).

H. montana Darker, needle cast, tar spot. Calif. to Idaho and Oreg. (2,3).

H. montivaga (Petr.) Dearn., needle cast, tar spot. Calif. to Mont. and Oreg. (2,3); Calif. (10).

Lembosia acicola (Harkn.) Sacc., black mildew. Calif. (11).

Lentinus lepideus Fr., wood rot, sometimes heart rot of living trees. Ariz. (3), Oreg. (5), widespread (7).

Leptostroma decipiens Petr., on needles. Idaho, Mont. (7).
Lophodermium nitens Darker, needle cast. Calif. (10).
L. pinastri (Schrad. ex Fr.) Chev., needle cast. Oreg. (1); Calif. to Alaska (2); northern Rocky Mountains (3); Washington (5); widespread (7); Calif. (5,10,11); on cultivated specimens—Ohio (3).
Mycosphaerella hypodermellae Wehm., needle spot on needles infected with *Hypodermella concolor* (Dearn.) Darker. Wyo. (3).
Naemacyclus niveus (Pers. ex Fr.) Sacc., on needles. Mont. to Utah and Wash. (3); Calif. (5,7,10); on cultivated specimens—Mass. (7).
Neofuckelia pinicola Zeller & Goodding, on branches, associated with *Atropellis* cankers. Oreg. (3).
Neopeckia coulteri (Pk.) Sacc., brown felt blight. Calif. (2); Colo. and northern Rocky Mountains to Oreg. and Wash. (3); Colo. to Calif. and Oreg. (7); Utah (9).
?Peniophora subincarnata (Pk.) Litsch.—Idaho (3).
Peridermium. For species having known telial stages, see *Coleosporium* and *Cronartium.*
P. cerebroides Meinecke (O rarely, I), rust gall. Calif. (1,10).
P. weirii Arth. (O,I), needle rust. Idaho (3). II and III unknown.
Pestalotia funerea Desm., seedling blight. Nebr. and on cultivated specimens in N.Y. (7).
Phaeocryptopus pinastri (Ell. & Sacc.) Petr., on needles following brown spot.
Polyporus amorphus Fr., sapwood rot of trunks and logs. Oreg. (1); Alaska, Idaho, Mont. (2); northern Rocky Mountains (7).
P. anceps (*P. ellisianus* (Murr.) Long), red ray rot, white pocket rot of standing trees and logs, western red rot in Black Hills region. Rocky Mountain States (2); Mont., Oreg. (3); Black Hills region of S. Dak. to Pacific Northwest and also Ariz., N. Mex., but uncommon in central Rocky Mountains (7).
P. circinatus Fr., root and butt rot, white pocket heart rot. Colo. (3).
P. osseus Kalchbr., brown butt rot. Colo. (3).
P. schweinitzii Fr., root and butt rot. General (3); widespread (5,8); Calif., Idaho, Mont., Oreg., S. Dak. (7).
P. sulphureus Bull. ex Fr., brown checked butt and heart rot. Mont. (7).
P. volvatus Pk., white pocket trunk rot following fire injury. Widespread (7).
Poria microspora Overh., heart rot. Colo. (3).
P. subacida Pk.—Calif. (2).
Rhizinia undulata Fr., seedling blight. Northern Rocky Mountains (3); Mont. (7); Calif. (10). Commonly cited in pathological literature as *R. inflata* (Schaeff.) Karst.
Rhizoctonia solani Kuehn, damping-off. Cosmopolitan.
Scirrhia acicola (Dearn.) Siggers (*Systremma acicola* (Dearn.) Wolf & Barbour), brown needle spot. Oreg. (1); Idaho (7); on cultivated specimens—Fla., La. (1,3,9,11); Ohio (3,5,7); Tenn. (5,7,9); Mo. (5,7). Conidial stage long known as *Septoria acicola* (Thuem.) Sacc.=*Lecanosticta acicola* (Thuem.) Syd.
Stereum rugisporum (Ell. & Ev.) Burt—Wash. (7).
Stilbospora pinicola Berk. & Curt., needle blight. Oreg. (3).
Thelephora fimbriata Schw.—Mont.
T. terrestris Ehr. ex Fr., on seedlings. Mont., Wyo. (3); northern Rocky Mountains (7); on cultivated specimens—Pa. (7), seedling blight—Kans. (7)?
Trametes americana Overh.—Widespread (7).
T. serialis Fr. (*Poria callosa* (Fr.) Sacc.), butt rot. Colo., Mont. (3); widespread (7).
T. tenuis Karst. (*T. isabellina* Fr., *Poria isabellina* (Fr.) Overh.), sapwood and heart rot of fallen trees and logs. Idaho, Mont., and general (3); widespread (7).

D. Southwestern species

(1) *Pinus cembroides* Zucc., piñon pine, and *P. edulis* Engelm. (=*P. cembroides* var. *edulis* Voss), nut pine. Range 9,11,13,14, 16,17. The name piñon is commonly applied to *P. edulis* in the U. S. and Mexican piñon to *P. cembroides* in the southern part of the range.
(2) *P. latifolia* Sarg. (*P. apacheca* Lemm.), Apache pine. Range 11 and 14.
(3) *P. leiophylla* Schiede & Deppe [apud Schlecht. & Cham.] var. *chihuahuana* (Engelm.) Shaw, Chihuahua pine. Range 11 and 14.
(4) *P. monophylla* Torr. & Frém., singleleaf piñon. Range 4,5,9,10,13,14.
(5) *P. quadrifolia* Parl. (*P. parryana* Engelm. non Gordon), Parry piñon. Range 5 and 10.

A group of small (2,3) to large trees (1,4,5), including several varieties which are often given species rank; (2,3) related to *P. ponderosa* Laws., western yellow pine.

Arceuthobium campylopodum Engelm. f. *divaricatum* (Engelm.) Gill, western dwarf mistletoe. Colo. and Utah to Calif. and N. Mex. (1); Ariz., Calif. (4); Rocky Mountain States to Pacific coast (4,5).
A. vaginatum (Willd.) Presl, southwestern dwarf mistletoe. Southern Rocky Mountain States (2,3).
Armillaria mellea Vahl ex Fr., root rot. Ariz., Colo., N. Mex., Utah (1).
Coleosporium crowellii Cumm. (III), needle rust. Ariz., Colo., N. Mex. (1).
C. ipomoeae (Schw.) Burr. (O,I), needle rust. Ariz. (3). II and III on *Ipomoea* spp. and other Convolvulaceae.
C. jonesii (Pk.) Arth. (O,I), needle rust. Ariz., Colo., Idaho, N. Mex., Utah (1). II and III on *Grossularia* and *Ribes* spp.
Cronartium coleosporioides (Diet. & Holw.) Arth. (O,I), western fusiform rust. Ariz. (3).
C. conigenum (Pat.) Hedgc. & Hunt (O,I), cone rust causing hypertrophy of cones. Ariz. (3). II and III on *Quercus emoryi* Torr. and *Q. hypoleuca* Engelm.
C. occidentale Hedgc., Bethel & Hunt (O,I), piñon blister rust, with swellings on branches and trunks. Central Rocky Mountain States to Calif. and N. Mex. (1); Colo. to Ariz., Calif. and Nev. (4). II and III on *Grossularia* and *Ribes* spp.
C. quercuum (Berk.) Miy. (O,I), pine-oak gall rust. Ariz. (3).
Diplodia pinea (Desm.) Kickx (*Sphaeropsis ellisii* Sacc.), seedling blight. Kans. (1).
Elytroderma deformans (Weir) Darker, needle cast, witches'-broom. Ariz., Colo., N. Mex. (1).
Fomes pini (Brot. ex Fr.) Karst., butt and heartwood rot. General (1).
F. pinicola Fr., brown crumbly heart rot. General within host range (2,3,4).
Hypoderma sp.—Calif. (5).
H. pini (Dearn.) Darker, needle cast, tar spot. Calif., Nev. (4).
H. saccatum Darker, needle cast, tar spot. Colo., N. Mex. (1).
Peridermium. For species having known telial stages, see *Coleosporium* and *Cronartium.*

Polyporus schweinitzii Fr., red brown butt and root rot. General within host range (2,3,4).

E. Exotic species

(1) *Pinus cembra* L., Swiss stone pine.

Tall, handsome, hardy tree of central Europe and Asia; cultivated, zone 4.

(2) *P. densiflora* Sieb. & Zucc., Japanese red pine; cultivated, zone 4.

(3) *P. griffithii* McClelland (*P. excelsa* Wall. non Lam., *P. nepalensis* De Chambray non Forbes), Himalayan pine.

(4) *P. halepensis* Mill., Aleppo pine.

Tall tree of Mediterranean region; cultivated, zone 7.

(5) *P. mugo* Turra (*P. montana* Mill.), mountain pine.

Shrublike tree of mountains of central and southern Europe, existing in several geographic and horticultural forms; cultivated, zone 2.

(6) *P. nigra* Arnold, Austrian pine.

Tall tree of central Europe to Asia Minor, cultivated, zone 4; several geographic varieties, viz.: var. *austriaca* (Hoess) Aschers. & Graebn. (*P. laricio* var. *austriaca* Loud.); var. *caramanica* (Loud.) Rehd., Crimean pine; and var. *poiretiana* (Ant.) Aschers. & Graebn., Corsican pine, and numerous garden forms.

(7) *P. sylvestris* L., Scots pine, Scotch pine.

Tall tree of Europe and Asia; cultivated in zone 2 and naturalized in the northeastern United States; important timber tree of Europe.

(8) *P. thunbergii* Parl., Japanese black pine; cultivated in zone 5.

Atropellis sp. (*?A. pinicola* Zeller & Goodding), canker. Mass., N.H., Pa. (7).

A. tingens Lohman & Cash, canker. Va. (2,6), Ohio (7).

Botrytis cinerea Pers. ex Fr., gray mold. Oreg. (4).

Cenangium atropurpureum Cash & Davidson—Md. (5,6), Pa. (7).

C. ferruginosum Fr. (*C. abietis* Pers. ex Rehm), on twigs. Mich. (2); N.Y. (5,6,7); Pa. (7).

Colesporium campanulae (Pers.) Lév. (O,I), needle rust. N.Y. (7). II and III on *Campanula, Specularia,* and *Lysimachia.*

C. delicatulum Hedgc. & Long (O,I), needle rust. Pa. (6).

C. solidaginis (Schw.) Thuem. (O,I), needle rust. N.J. (5,6,7); Conn., Pa. (6); Md. (8).

C. sonchi-arvensis (Pers.) Lév. (O,I), needle rust. Wis. (7). II and III on *Sonchus asper* (L.) Hill.

C. vernoniae Berk. & Curt. (O,I), needle rust. Ohio (5,6,7); Ind., Ky. (6).

Cronartium cerebrum Hedgc. & Long (=*?C. quercuum* (Berk.) Miyabe), (O,I), gall rust. Calif. (4).

C. comandrae Pk. (O,I), Comandra blister rust, with swellings on twigs and trunks. Eastern States (7).

C. comptoniae Arth. (O,I), sweetfern blister rust. Pa. (2); New England to Ohio (5); Vt. to N.J., Ohio, and Wis. (6); New England to Mo. and Wis. (7).

C. quercuum (Berk.) Miy. (O,I), eastern gall rust. Mass. (2); Mass. to Pa. and Mich. (7). A form known as Woodgate rust, which is tentatively placed here, is characterized by repeating aeciospore infection of pines and no telial stage is known; it occurs in N.H., N.Y., and Mich.

Cylindrocladium scoparium Morg., root and stem rot of seedlings. Md., N.J., Pa., Wash. (7).

Cytospora pinastri Fr., needle blight. Maine, N.J., Pa. (7).

Dasyscypha calycina (Fr.) Fckl., on twigs. Mass. (7).

D. ellisiana (Rehm) Sacc., canker, on twigs. Conn. (1,6); Ohio (6); Mass., N.J., Pa., R.I. (7).

Diplodia pinea (Desm.) Kickx (*Sphaeropsis ellisii* Sacc.), tip blight, dieback, collar rot of seedlings. Md. (3); Conn., Iowa, N.J., N.Y., Va. (5); Maine to Tenn., Okla., Kans., and S. Dak. (6); New England to Va., Kans., Iowa, and Wis. (7).

Dothichiza pithyophila (Cda.) Petr. (*Phoma acicola* Sacc.), on dying needles. N.J. (6).

Dothistroma pini Hulbary, needle blight. Ill., Iowa, Ohio, Okla., Md. (6).

Fomes annosus Fr., root and butt rot. Conn. (7).

F. pini (Brot. ex Fr.) Karst., red ring rot. Widespread (7).

Hoplolaimus coronatus Cobb, in roots. Fla. (6).

Hypoderma desmazierii Duby, needle cast. N.J., N.Y. (6).

H. lethale Dearn., needle cast. N.Y., Pa. (6).

Leptothyrium pinastri Karst., on needles. Mo. (6).

Lophodermium nitens Darker—Ga. (3).

L. pinastri (Schrad. ex Fr.) Chev., needle cast. Ga., Ill., Mass. (5); Conn., Oreg. (6); New England, Ga., Ill. (7); Md. (8).

Macrophoma magnifructa (Pk.) Sacc.—Tex. (4).

Naemacyclus niveus (Pers. ex Fr.) Sacc., needle cast. Oreg. (6); Ga., Mass., Mich. (7).

Ophionectria scolecospora Bref., bark canker on twigs. Iowa (7).

Peridermium. For species having known telial stages, see *Coleosporium* and *Cronartium.*

Pestalotia sp.—N.J. (5).

P. funerea Desm., on senescent needles. Pa. (5), widespread (7).

P. peregrina Ell. & G.Martin, on needles and twigs. N.J. (6).

Phomopsis conorum (Sacc.) Died., on twigs. Iowa (7).

Physalospora obtusa (Schw.) Cke., cone and seed rot. Conn., Ind. (6).

Phytophthora cactorum (Leb. & Cohn) Schroet., root rot of seedlings. Minn. (7).

P. cinnamomi Rands—Md., Va. (7).

Polyporus schweinitzii Fr., red-brown butt and root rot. Widespread (2), N.Y. (7), general (8).

Rhizoctonia solani Kuehn, damping-off. N.H. (5), cosmopolitan (7).

Scirrhia acicola (Dearn.) Siggers (*Systremma acicola* (Dearn.) Wolf & Barbour), brown spot of needles. Fla. (4,8); Ohio (6,7); Kans., Ky., Mo. (6). Conidial stage long known as *Septoria acicola* (Thuem.) Sacc.=*Lecanosticta acicola* (Thuem.) Syd. According to Siggers not found in Ohio, Kans., Ky., and Mo. as reported. (U.S. Dept. Agr. Tech. Bul. 870).

Septoria sp., brown spot. Kans., Va. (6).

Tympanis sp., trunk canker. Pa. (2), Conn. (2,7). Frequently reported as *T. pinastri* Tul.

Valsa collicula (Wormsk.) Cke.—Pa. (7).

NEEDLE FUSION—mycorrhizal deficiency or lack of mycorrhizal development. Ariz. (4). (Cf. Rev. Appl. Mycol. 21:312).

POLE BLIGHT—cause unknown. Idaho, Mont., Wash. (6).

F. Unspecified species

Armillaria mellea Vahl ex Fr., root rot. Widespread.

Atropellis tingens Lohman & Cash, branch and trunk canker, bluish-black wood stain. On various pines from New England to Fla., Ark., Tex., Okla., and Ohio.

Bifusella linearis (Pk.) Hoehn., tar spot, needle cast.

Maine to N.C. and Minn.; Colo. to Idaho and Wash.

Botrytis cinerea Pers., seedling blight. Cosmopolitan.

Cadophora brunnescens Davidson and *C. repens* Davidson, wood stain. Fla., La.

Caliciopsis pinea Pk., on bark, ?saprophytic. Mass., N.J., N.Y., Pa., Vt.

Cenangium ferruginosum Fr. (*C. abietis* Pers. ex Rehm), twig blight. Maine, N.J., Ohio, Mont. to Oreg. and Wash.

Ceratostomella spp., blue or gray stain of wood (by some species), possibly also tracheomycosis. The most prevalent and widespread species are: *C. ips* Rumbold and *C. pilifera* (Fr.) Wint. Other species reported as associated with wood stain, chiefly in the Southern States, are: *C. exigua* Hedgc., *C. multiannulata* Hedgc. & Davidson, *C. obscura* Davidson, *C. pini* Münch, and *C. pluriannulata* Hedgc.

C. montium Rumbold—S. Dak. to Colo. and Wash.

Coleosporium spp., commonly on seedlings and saplings, rare on nursery stock and trees.

C. senecionis (Pers.) Fr.—Collected twice in II and III stages on *Senecio vulgaris* L. in Colo. and R.I. Not yet reported on *Pinus* spp.

C. solidaginis (Schw.) Thuem. (O,I), needle rust. On all 2- and 3-needle pines in eastern U.S. II and III on various Compositae, commonly *Aster* and *Solidago* spp.

C. vernoniae Berk. & Curt. (O,I), needle rust. On various 2- and 3-needle pines from Mass. to Fla., Tex., and Kans. II and III on *Vernonia*.

Coniophora arida (Fr.) Karst. and *C. cerebella* Pers. ex Schroet. (=*C. puteana* (Schum. ex Fr.) Karst.), brown cubical rot of logs and timber. Widespread.

Cronartium comptoniae Arth. (O,I), sweetfern blister rust (O,I), with swellings on branches and trunks. On 2- and 3-needle pines from the New England to the Central and Great Lakes States. II and III on *Comptonia peregrina* (L.) Coult. and *Myrica gale* L.

C. quercuum (Berk.) Miy. (*C. cerebrum* Hedgc. & Long) (O,I), eastern gall rust, with galls on branches and trunks. On 2- and 3-needle pines in the Eastern States to the Rocky Mountains, especially in the Southeastern States. II and III on *Quercus* spp. and rarely on *Castanea*.

Cytospora pinastri Fr., ?needle cast. Maine, N.J.

Dacryomyces spp., common on decaying wood; one species (unnamed) invades sapwood and causes wood stain of hard pines in the South.

Dasyscypha spp., commonly saprophytic on branches and twigs. Species reported include: *D. arida* (Phill.) Sacc.—Western States; *D. agassizii* (Berk. & Curt.) Sacc.—Widespread; *D. oblongospora* Hahn & Ayers—New England; and others.

D. ellisiana (Rehm) Sacc., on branches and twigs of native pines and causing cankers on introduced pines in the Eastern States.

D. pini (Brunch.) Hahn & Ayers, branch and twig canker on 5-needle pines. Pacific Northwest and Mich.

D. serinella (Quél.) Sacc.—Oreg.

Diplodia spp., on logs and timber causing blue-gray stain, also on branches, twigs, and roots. Species reported include: *D. megalospora* Berk. & Curt., on dead branches of various *Pinus* spp. in Mass. to Ga. and Ill.; *D. natalensis* P. Evans in the South; *D. pinastri* (Lév.) Grove—Widespread; *D. pinea* (Desm.) Kickx (*Sphaeropsis ellisii* Sacc.), twig and seedling blight. New England to Tenn. and Nebr.

Dothistroma pini Hulbary, needle blight. Ill., Iowa, Ohio, Okla.

Elytroderma deformans (Weir) Darker, needle cast, witches'-broom. On various pines, chiefly in the Western States, also in the Southeast.

Endoconidiophora coerulescens Münch (American form =*E. virescens* Davidson) and *E. moniliformis* (Hedgc.) Davidson, gray sapwood stain. On hard pines in the South.

Fomes spp., wood rot of standing trees, logs, and timber, especially:

F. annosus (Fr.) Cke., root and butt rot, white spongy heart rot. Chiefly northern, from New England to Pacific Northwest; also Fla.

F. officinalis (Vill. ex Fr.) Faull, brown cubical heart rot. Pacific coast, northern Rocky Mountains and New England.

F. pini (Brot. ex Fr.) Karst. (*Trametes pini* Brot. ex Fr.), red ring rot, butt rot, white pocket heart rot. Frequent in living trees. Widespread.

F. pinicola (Sw. ex Fr.) Cke., brown crumbly rot of trunks and logs. Widespread.

F. subroseus (Weir) Overh., brown cubical rot of trunks and logs. Widespread.

Fusarium spp., seedling blight, seed rot. Frequent and widespread but species poorly defined; pathogenicity demonstrated especially in the following: *F. arthrosporioides* Sherb., *F. sambucinum* Fckl., and *F. sporotrichioides* Sherb.; also in some strains of *F. avenaceum* (Fr.) Sacc., *F. moniliforme* Sheld., *F. oxysporum* Schlecht., *F. solani* (Mart.) Appel & Wr., and *F. vasinfectum* Atk.

Ganoderma lucidum (Leyss. ex Fr.) Karst., wood rot. Maine, Mich.

Graphium rigidum Pers. ex Sacc. and *G. rubrum* Rumbold, gray wood stain. On hard pines in the South.

Herpotrichia nigra Hartig, brown felt blight. On snow-buried foliage, especially at high altitudes in the West.

Hormiscium gelatinosum Hedgc., blue-stain of pine lumber. On southern pines (longleaf). Probably most active blue-stain fungus in dry wood.

Hypoderma spp., needle cast, tar spot. Species reported include the following:

H. desmazierii Duby, commonly on white pine or sometimes others. Eastern States.

H. hedgcockii Dearn., on hard pines. Southeastern States.

H. lethale Dearn., gray blight of hard pines. Eastern and Gulf States.

Lasiosphaeria pezizula (Berk. & Curt.) Sacc., gray-olive wood stain of various pines. Southern States.

Lecanosticta acicola (Thuem.) Syd.: SEE *Scirrhia acicola*.

Lentinus lepideus Fr., brown cubical sapwood rot, or sometimes heart rot, of living trees; also on logs and timber. Widespread.

Lenzites spp., brown cubical rot of logs, slash, and timber, especially *L. saepiaria* Wulf. ex Fr. and *L. trabea* Pers. ex Fr.—Widespread.

Leptostroma pinastri Desm.: SEE *Lophodermium pinastri*.

Lophodermium nitens Darker, needle cast of 5-needle pines. Pacific Northwest and Northeastern States.

L. pinastri (Schrad. ex Fr.) Chev., needle cast of various pines. Widespread.

Macrophoma magnifructa (Pk.) Sacc., twig blight. Tex.

Merulius spp., rot of logs and slash, especially *M. aureus* Fr., *M. tremellosus* Schrad. ex Fr.; also *M. lachrymans* Jacq. ex Fr., dry rot of structural timber. Widespread.

Mycosphaerella acicola (Cke. & Harkn.) Lindau, on needles. Calif.

Naemacyclus niveus (Pers. ex Fr.) Sacc., needle cast of various pines. Occasional.

Nectria cucurbitula Tode ex Fr., on branches. Widespread.

Neofuckelia pinicola Zeller & Goodding, on cankered branches associated with *Atropellis*. Pacific Northwest.

Neopeckia coulteri (Pk.) Sacc., brown felt blight. Widespread.

Ophionectria scolecospora Bref., on branches. Widespread.

Peniophora spp., rot of logs and slash, especially *P. gigantea* (Fr.) Mass.—Widespread.

Peridermium. For species having known telial stages see *Coleosporium* and *Cronartium*.

Pestalotia funerea Desm., on senescent needles of various pines. Widespread; seedling root rot. Md.

Phacidium infestans Karst., snow blight of juvenile plants. New England.

Phoma spp., on twigs and cones. Doubtfully parasitic and sometimes confused with *Diplodia* and *Sphaeropsis*. Species reported include: *P. acuum* Cke. & Ell.—N.Y.; *P. harknessii* Sacc.—Calif. and Mass.; *P. pinicola* (Zopf) Sacc.—Oreg.; *P. strobiligena* Desm.—Mich.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Physalospora obtusa (Schw.) Cke., on branches and cones, also causes decay of seed. Occasional in the East. A wound parasite or a saprophyte following injury.

Phytophthora cactorum (Leb. & Cohn) Schroet., seedling blight. New England and Great Lakes States.

P. cinnamomi Rands—Md.

Polyporus spp., rot of logs and slash, sometimes root, butt, and heart rot of living trees. Species most frequently and widely reported, chiefly as saprophytes, include: *P. abietinus* Dicks. ex Fr.; *P. amorphus* Fr.; *P. borealis* Fr.; *P. cinnabarinus* Jacq. ex Fr.; *P. fibrillosus* Karst.; *P. fragilis* Fr.; *P. gilvus* (Schw.) Fr.; *P. guttulatus* Pk.; *P. hirtus* Fr., *P. lapponicus* Rom., and *P. leucospongia* Cke. (these last three species chiefly in the West); *P. palustris* Berk. & Curt. in the South; *P. versicolor* L. ex Fr.; and *P. volvatus* Pk.

P. circinatus Fr., root and butt rot, white pocket heart rot. New England to Minn.; Pacific Northwest, Fla.

P. schweinitzii Fr., root and butt rot, brown cubical heart rot. Widespread.

P. sulphureus Bull. ex Fr., butt rot, brown cubical heart rot. Widespread but chiefly in the West on pines; occasional in the East.

Poria spp., wood rot of logs, slash, and timber. Numerous species common and widespread, chiefly as saprophytes. Species reported include: *P. incrassata* (Berk. & Curt.) Burt, dry rot of structural timber; *P. purpurea* (Fr.) Cke.; *P. taxicola* Pers. ex Bres.; *P. vaporaria* Pers. ex Fr.; *P. xantha* (Fr.) Cke.; *P. xantha* f. *crassa* Karst.; and others.

P. albobrunnea Rom., brown sapwood rot. Idaho.

P. cocos Wolf, on roots. Southeastern States.

P. monticola Murr., active dry rot fungus on southern pines. According to Overholts this is the resupinate form of *Trametes serialis* Fr.; he calls it *Poria callosa* (Fr.) Cke.

P. subacida Pk., spongy root rot. Widespread.

Pullularia pullulans (d By.) Berkhout, gray wood stain. Southern States.

Pythium spp., damping-off. Cosmopolitan. Reports usually vague as to species, but the following have been shown to be parasitic on pines; *P. aphanidermatum* (Edson) Fitz., *P. debaryanum* Hesse, and *P. ultimum* Trow.

Rhabdospora pini (Berk. & Curt.) Sacc., on branches.

Rhizoctonia solani Kuehn, damping-off. Cosmopolitan.

R. sylvestris Melin, ectotrophic mycorrhiza. New England.

Rhizopogon parasiticus Coker & Totten, ectotrophic mycorrhiza. N.C.

Schizophyllum commune Fr., on logs and stumps. Occasional.

Scirrhia acicola (Dearn.) Siggers (*Systremma acicola* (Dearn.) Wolf & Barbour), brown spot of needles. On hard pines in the Southeastern and Southern States, also the Pacific Northwest. Conidial stage long known as *Septoria acicola* (Thuem.) Sacc.=*Lecanosticta acicola* (Thuem.) Syd. (U.S. Dept. Agr. Tech. Bul. 870).

Septoria acicola (Thuem.) Sacc.: See *Scirrhia acicola*.

Stereum spp., wood rot of logs, slash, and occasionally standing trees: *S. abietinum* Pers. ex Fr., *S. ambiguum* Pk., and *S. pini* Fr. chiefly in Northeastern States; *S. rugisporum* (Ell. & Ev.) Burt in the West; *S. sanguinolentum* Alb. & Schw. ex Fr., top rot, white pocket rot—New England to Pacific Northwest.

Thelephora terrestris Ehr. ex Fr., smothering of seedlings. Northern Rocky Mountains, occasionally in the East.

Trametes spp., wood rot of logs and timber. Species reported include: *T. americana* Overh. (*T. odorata* Amer. Auct.; =*Poria odorata* Wulf. ex Fr. according to Baxter); *T. tenuis* Karst. (*T. isabellina* Fr., *Poria isabellina* (Fr.) Overh.); *T. serialis* Fr. (*Poria callosa* (Fr.) Sacc.), especially frequent in structural timber; *T. variiformis* Pk.—Widespread but chiefly in the North.

Valsa spp., on branches and twigs, ?canker. Species reported include: *V. abietis* Fr.; *V. colliculus* (Wormsk. ex Fr.) Cke. in Northeastern States; *V. kunzei* Fr.; *V. pini* Alb. & Schw. ex Fr.; and *V. superficialis* Nit., canker of introduced pines—Mich.

Mycorrhiza—Ectotrophic mycorrhizas of pines are of widespread occurrence in the U.S., especially in eastern forests, less so in those of the Rocky Mountains and have been held to be examples of root parasitism. Only a few of the fungus components have been identified, such as *Amanita muscaria* L. ex Fr., *Boletus bicolor* Pk., *B. brevipes* Pk., *B. chromipes* Frost, *B. eximius* Pk., *B. granulatus* L. ex Fr., *Cantharellus cibarius* Fr., *Russula lepida* Fr., and *Scleroderma vulgare* Hornem. In some cases parasitism of seedling roots has been demonstrated, e.g. *Rhizoctonia sylvestris* Melin (=*?Mycelium radicis atrovirens*) and *Rhizopogon parasiticus* Coker & Totten.

Pseudolarix

P. amabilis (Nels.) Rehd., goldenlarch.

Deciduous resinous tree of China, cultivated for ornament, zone 5.

Dasyscypha willkommii (Hartig) Rehm, canker. Mass.

Pseudotsuga

(1) *P. macrocarpa* (Vasey) Mayr, bigcone-spruce.

Large evergreen tree. Range 4,5,10; not hardy North.

(2) *P. taxifolia* (Poir.) Britt., Douglas-fir.

Large evergreen tree, very variable, existing in several geographic forms, sometimes distinguished as three botanical varieties, or two species and one variety. The coast form, var. *viridis* (Schwer.) Aschers. & Graebn., occurs in range 1,2,3,4,5,6. The intermountain form, var. *caesia* (Schwer.) Aschers. & Graebn., occurs in range 6,7,12. Their cultivated zone limit

is zone 6. The mountain form, var. *glauca* (Mayr) Schneid., occurs in range 9,11,13,14,16 and is hardy in zone 4.

Adelopus gaeumanni Rohde (*Phaeocryptopus gaeumanni* (Rohde) Petr.), needle cast. Endemic but noninjurious in the Pacific Coast States, usually on the coast form (var. *viridis*), infrequently on the intermountain and mountain forms; pathogenic to planted Douglas firs in New England. The spelling "gäumanni" was used in the original description.

Aleurodiscus spp., on bark, sometimes weakly parasitic. Species reported include: *A. amorphus* (Pers.) Rab.—Widespread (2); *A. penicillatus* Burt—Oreg. (2); *A. subcruentatus* (Berk. & Curt.) Burt.—Calif. and Oreg. (2).

Arceuthobium douglasii Engelm., dwarf mistletoe, witches'-broom. Mont. to Colo. and eastern Oreg. and Wash. (2).

Armillaria mellea Vahl ex Fr., root rot. Cosmopolitan (2).

Bacterium pseudotsugae Hans. & R. E. Smith, bacterial gall. Calif. (1,2).

Botrytis cinerea Pers. (*B. douglasii* Tub.), gray-mold twig blight, snow mold of seedlings. Cosmopolitan (2).

Brunchorstia boycei (Dearn.) Hahn (*B. gibbosa* Wr.), bark canker. Wash. (2).

Ceratostomella pseudotsugae Rumbold, sapwood stain. Oreg., Wash. (2).

Chondropodium pseudotsugae W.L.White, bark canker. Oreg. (2).

Coniophora cerebella Pers.—Idaho (2).

C. olivacea (Fr.) Karst.—Mont. (2).

Cryptosporium boycei Dearn.: SEE *Brunchorstia boycei.*

Cytospora sp., twig canker. Colo., N.J., Oreg.,—cultivated (2). Conidial stage of *?Valsa abietis* Fr.

Dasyscypha ellisiana (Rehm) Sacc., twig canker. Mass., N.C., R.I. (2).

D. pseudotsugae Hahn, branch and trunk canker. Calif. to Wash. (2). Other *Dasyscypha* spp. are saprophytic on branches and twigs; reports include: *D. agassizii* (Berk. & Curt.) Sacc., *D. arida* (Phill.) Sacc., and *D. ciliata* Hahn in the West on (2); *D. calycina* Fckl.—Mass., R.I. (2); *D. oblongospora* Hahn & Ayers—New England (2).

Diplodia pinea (Desm.) Kickx (*Sphaeropsis ellisii* Sacc.) dieback, collar rot, seedling blight. Calif., Kans., N.J., N.Y.

Echinodontium tinctorium Ell. & Ev., brown stringy heart rot. Mont. to Utah, Oreg., and Wash. (2).

Endoconidiophora coerulescens Münch, sapwood stain. Calif. (2).

Fomes annosus (Fr.) Cke., brown root and butt rot, white pocket rot. Mont. to Oreg. and Wash. (2).

F. applanatus (Pers. ex Fr.) Gill., white-mottled root and butt rot. Mont. to Oreg. and Wash. (2).

F. officinalis (Vill. ex Fr.) Faull (*F. laricis* (Jacq.) Murr.), reddish brown trunk rot. Mont. to Calif., Oreg., and Wash. (2).

F. pini (Brot. ex Fr.) Karst. (*Trametes pini* Brot. ex Fr.), red ring rot, white pocket heart rot. Widespread (2).

F. pinicola (Sw. ex Fr.) Cke., brown cubical trunk rot. Widespread (2). This species is the most prevalent cause of deterioration of dead trees in Oreg. and Wash.

F. putearius Weir (=*?F. nigrolimitatus* (Rom.) Egel.), white pocket rot. Mont., Wash. (2).

F. roseus (Alb. & Schw. ex Fr.) Cke., yellow-brown trunk rot, brown cubical rot. Widespread (2).

F. subroseus (Weir) Overh., brown cubical rot. Widespread (2).

Fusarium spp., seed rot, damping-off. *F. avenaceum* (Fr.) Sacc., *F. moniliforme* Sheldon, *F. oxysporum* Schlecht., and *F. solani* (Mart.) Appel & Wr., among others, shown pathogenic. Cosmopolitan (2).

Ganoderma oregonense Murr., white pocket rot. Mont., Wash. (2).

Herpotrichia nigra Hartig, brown felt blight. Rocky Mountains and Pacific Northwest (2).

Hydnum coralloides Scop. ex Fr., white pocket rot, sometimes on living trees. Pacific Northwest (2).

Lentinus lepideus Fr., brown cubical rot of logs and timber, sometimes heart rot of living trees. Pacific Northwest (2).

Lenzites saepiaria Wulf. ex Fr. and *L. trabea* Pers. ex Fr., brown sapwood rot of slash and logs. Widespread (2).

Leptothyrium pseudotsugae Dearn., flyspeck on needles. Colo. (2).

Melampsora albertensis Arth. (*Caeoma occidentale* Arth.) (O,I), needle rust. Calif. (1); Mont. to Colo., Utah, and Wash. (2). II and III on *Populus* spp.

Phacidium infestans Karst., snow blight. Idaho (2).

Phoma (*Sclerophoma*) *douglasii* Oud., on twigs. Colo. (2).

Phomopsis lokoyae Hahn, stem canker. Pacific Coast States (2, var. *viridis*).

P. occulta Trav., on dead twigs. Widespread (2). Conidial stage of *Diaporthe conorum* (Desm.) Niessl. The perfect stage is rare in North America; the pycnidial stage is weakly parasitic on the coast form (*viridis*) of the host.

Phoradendron flavescens (Pursh) Nutt., mistletoe. Tex. (2).

Phyllosticta sp., on needles. Oreg. (2).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).

Polyporus spp., rot of trunks, logs, and slash, characteristically white pocket or spongy rot; sometimes sapwood or heart rot of living trees. Species reported include: *F. adustus* Willd. ex Fr., *P. abolutus* Ell. & Ev., *P. amorphus* Fr., *P. fibrillosus* Karst., *P. guttulatus* Pk., *P. hirsutus* Wulf. ex Fr., *P. leucospongia* Cke. & Harkn., *P. resinosus* Schrad. ex Fr., *P. versicolor* L. ex Fr., *P. volvatus* Pk.—Occurrence of these species is occasional to general in range of host (2).

P. abietinus Dicks. ex Fr., sapwood rot—General (2).

P. anceps Pk. (*P. ellisianus* (Murr.) Long), red ray heart rot. Idaho, Oreg., Wash. (2).

P. circinatus Fr., root and butt rot, white pocket heart rot. Idaho (2).

P. schweinitzii Fr., reddish-brown root, butt, and heart rot. Widespread, including planted Douglas firs in the East (2).

P. sulphureus Bull. ex Fr., brown cubical heart rot. Widespread (2).

Poria spp., rot of logs and slash. Occasional throughout range of host (2). Species reported include: *P. cinerescens* Bres., *P. dichora* Bres., *P. lenis* Karst., *P. purpurea* (Fr.) Cke., *P. subacida* (Pk.) Sacc., and *P. xantha* (Fr.) Cke.

P. carbonica Overh., on dead logs and timber. Idaho, Oreg., and Wash. (2).

P. incrassata (Berk. & Curt.) Burt, dry rot of timber. Pacific Northwest (2).

P. micrispora Overh., brown cubical rot. Oreg. (2). This fungus often identified as *Trametes serialis* Fr.

P. weirii Murr., destructive root and heart rot. Oreg., Wash. (2).

Pythium ultimum Trow, damping-off. Colo. (2).

Rhabdocline pseudotsugae Syd. (*?Rhabdogloeum pseudotsugae* Syd.), needle cast. Pacific Northwest, Ariz., Colo., and Calif., probably general in range of host; Mass., N.Y., Pa., R.I. (cultivated)

(2). Occurs on both coast and intermountain forms, especially the latter. Cooley gall aphid (*Adelges cooleyi* Gill.) is commonly associated with needle cast attack on Douglas fir. Its habit has suggested a possible vector relationship to this disease. See the following.

Rhabdogloeum hypophyllum D.E.Ellis & Gill, on needles. Ariz., N. Mex. (2). Associated with *Rhabdocline pseudotsugae* Syd.; it, and not *Rhabdogloeum pseudotsugae* Syd., is probably the imperfect stage.

Rhizina undulata Fr., seedling blight. Pacific Northwest (2). Commonly cited in the pathological literature as *R. inflata* (Schaeff.) Karst.

Rhizoctonia solani Kuehn, damping-off. Cosmopolitan (2).

Sparassis radicata Weir, yellow-mottled root rot. Pacific Northwest (2).

Sphaeropsis ellisii Sacc.: See *Diplodia pinea.*

Stereum spp., white pocket rot of logs and slash. Pacific Northwest (2). Reports include: *S. chailletii* Pers. ex Fr., *S. sanguinolentum* Alb. & Schw. ex Fr., *S. sulcatum* Burt.

Thelephora terrestris Ehr. ex Fr., smothering of seedlings. Pacific Northwest (2).

Trametes spp., rot of logs and timber. Pacific Northwest (2). Species reported include: *T. americana* Overh., *T. heteromorpha* (Fr.) Lloyd, *T. hispida* Bagl., and *T. tenuis* Karst. (*T. isabellina* Fr., *Poria isabellina* (Fr.) Overh.).

Valsa abietis Fr., on twigs and branches. Colo., Idaho, Oreg., Wash. (2).

Sciadopitys

S. verticillata (Thunb.) Sieb. & Zucc., umbrella-pine.

Ornamental evergreen tree, pyramidal in shape, cultivated in zone 5.

Phyllosticta sp., leaf spot. R.I.

Rhizoctonia solani Kuehn, damping-off, root rot. Conn.

Sphaeropsis sp. (*?S. ellisii* Sacc.), twig blight. N.J.

Sequoia

(1) *S. gigantea* (Lindl.) Decne., giant sequoia.
(2) *S. sempervirens* (Lamb.) Endl., redwood.

Tremendous evergreen trees of central California (1) or in the coastal zone of central California to southern Oregon (2); occasionally grown for ornament in the South (1) or the Far South (2); (2) is of great timber value, and the burls are sometimes grown as house plants. All records of disease occurrence are in California unless otherwise indicated.

Acanthostigma sequoiae (Plowr.) Sacc., on needles. (1).

Armillaria mellea Vahl ex Fr., root rot. (2).

Botrytis cinerea Pers. ex Fr., twig blight after frost injury. Md. (2).

B. douglasii Tub. (*?B. cinerea* Pers. ex Fr.), seedling blight. Calif., Ohio, Pa. (1); (2).

Cercospora sequoiae Ell. & Ev., needle blight. Md., Pa. (1).

Chloroscypha chloromela (Phill. & Harkn.) Seaver, ?needle blight. (2).

Clithris sequoiae Bonar, on twigs. (2).

Cytospora pinastri Fr., on twigs. (2).

Dermatea livida (Berk. & Br.) Phill., bark canker. (2).

Fomes annosus (Fr.) Cke., trunk rot. (1,2).

Ganoderma sequoiae Murr., trunk rot. (2).

Hexagonia carbonaria Berk. & Curt., wood rot. (2).

Hymenochaete tabacina (Sow. ex Fr.) Lév., wood rot. (2).

Lenzites saepiaria Wulf. ex Fr., wood rot. (1).

Leptostroma sequoiae Cke. & Harkn., on twigs. (2).

Macrophoma sp., on twigs. Md. (2).

Merulius hexagonoides Burt, wood rot. (2).

Mycosphaerella sequoiae Bonar, needle blight. (2).

Pestalotia funerea Desm., needle blight. Tex. (1).

Phomopsis juniperovora Hahn, twig blight. (1). According to Hahn this species not on *Sequoia.*

P. occulta Trav., on dead twigs. (1); Md. (2). Conidial stage of *Diaporthe conorum* (Desm.) Niessl.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2). ?Experimental.

Polyporus spp., wood rot. Reports include: *P. amorphus* Fr., *P. sulphureus* Bull. ex Fr., and *P. versicolor* L. ex Fr.—(2).

Poria incrassata (Berk. & Curt.) Burt, dry rot of timber. (2).

P. sequoiae Bonar, brown pocket heart rot. (2).

Schizophyllum commune Fr., wood rot. (2).

Stereum fasciatum Schw. and *S. hirsutum* Willd. ex Fr., wood rot. (2).

Trametes spp., wood rot. Reports include: *T. americana* Overh., *T. carbonaria* Berk. & Curt. (*T. sequoia* Copeland), and *T. tenuis* Karst.—(2).

Wallrothiella consociata (Ell. & Harkn.) Ell. & Ev., on needles. (1).

Trunk galls (burls)—cause unknown.

Taxodium

Taxodium spp., chiefly *T. distichum* (L.) Rich., baldcypress, and *T. ascendens* Brongn., pondcypress.

Resinous decidous trees: *T. distichum* of range 17,20,25,28,29,30,31,32; *T. ascendens* of range 29,30. Both furnish cypress timber of the lumber industry; *T. distichum* grown for ornament, zone 4.

Fomes applanatus (Pers. ex Fr.) Gill., butt rot. Fla.

F. extensus Lév., white pocket heart rot. Fla.

F. geotropus Cke., brown pocket heart rot. Southern States especially Fla. to Tex. The term "pecky cypress" is applied to wood affected with this pocket rot.

F. robustus Karst., var. *taxodii* Baxter—Ga.

F. subroseus (Weir) Overh.—Fla.

F. taxodii Murr.—Fla.

Geotrichum sp., pink wood stain. Gulf States.

Lenzites spp., especially *L. trabea* Pers. ex Fr., brown cubical rot of logs and timber. *L. saepiaria* Wulf. ex Fr. and *L. striata* Sw. ex Fr. are also reported from Fla.

Mycosphaerella taxodii (Cke.) Lindau, on needles. S.C.

Pestalotia funerea Desm., twig blight. Tex.

Phomopsis occulta Trav., on twigs. N.C.

Phymatotrichum omnivorum (Shear) Dug., root rot.

Polyporus spp., wood rot, usually on dead trunks and logs, sometimes on living trees. Species reported include: *P. abietinus* Dicks. ex Fr.—S.C.; *P. gilvus* (Schw.) Fr.—La.; *P. hirsutus* Wulf. ex Fr.—S.C.; *P. tenuis* (Sacc.) Overh.—Fla., La.; *P. versatilis* (Berk.) Overh.—Ga., La.; *P. versicolor* L. ex Fr. —Fla., La.

Poria spp., wood rot, usually of logs, sometimes dry rot of timber. Species reported include: *P. cocos* Wolf—Tenn.; *P. incrassata* (Berk. & Curt.) Burt — Southern States; *P. juniperina* Murr. — Ark.; and *P. taxodium* Baxter—Ill.

Septobasidium spp., felt fungus. Species reported include: *S. mariani* Bres.; *S. pseudopedicellatum* Burt; and *S. taxodii* Couch—La.

Thuja, arborvitae

See page 117.

Thujopsis

See page 118.

Tsuga, hemlock

(1) *T. canadensis* (L.) Carr., Canada or common hemlock.

Evergreen forest tree of range 22,23,24,25, 27,28; source of lumber and tanbark; grown for ornament in numerous horticultural forms, zone 4.

(2) *T. caroliniana* Engelm., Carolina hemlock.

Evergreen tree of range 27; grown for ornament, zones 5 and 6.

(3) *T. heterophylla* (Raf.) Sarg., western hemlock.

Large forest tree of range 1,2,4,6,12; important source of lumber.

(4) *T. mertensiana* (Bong.) Carr., mountain hemlock.

Evergreen tree of range 4,12.

Adelopus nudus (Pk.) Hoehn. (*?Phaeocryptopus nudus* (Pk.) Petr.)—N.Y. (1). (Cf. Mycologia 39:479.)

Aleurodiscus amorphus (Pers. ex Fr.) Rab. and *A. farlowii* Burt, on branches and trunks of suppressed trees. New England (1).

Arceuthobium campylopodum Engelm. f. *tsugensis* (Rosendahl) Gill, dwarf mistletoe. Mont. to Oreg. and Alaska (3); Idaho, Wash. (4).

Armillaria mellea Vahl ex Fr., root and butt rot. Mass. to Pa. and Mich. (1); Oreg., Wash. (3).

Ascochyta conicola Dearn. & House, on cone scales. N.Y. (1).

Asterina nuda Pk.: See *Adelopus nudus.*

Botrytis sp., twig blight. N.J. (1).

B. cinerea Pers. ex Fr., seedling twig blight. Idaho (3).

Caeoma dubium C.A.Ludwig (O,I), needle rust. Idaho, Mont., Oreg., Wash. (3).

Caliciopsis pinea Pk., on dead bark of saplings, ?bark canker. Pa. (1).

Cenangium balsameum Pk. and *C. balsameum* var. *abietinum* Pk.: See *Dermatea balsamea.*

Ceratostomella sp., blue stain. Oreg., Wash. (3).

Coniophora puteana (Schum. ex Fr.) Karst., sapwood rot, chiefly of slash. Widespread (1); Idaho, Wash. (3).

Cylindrocladium scoparium Morg., seedling root rot. N.J. (1).

Cytospora sp. (*?C. curreyi* Sacc.), twig canker. Md., Va. (1).

Dasyscypha agassizii (Berk. & Curt.) Sacc., on branches. N.Y. (1).

D. arida (Phill.) Sacc., on branches. Idaho (4).

Dermatea balsamea (Pk.) Seaver, canker, twig blight. Ga., N.Y., Tenn., Va. (1).

Didymascella tsugae (Farl.) Maire (*Keithia tsugae* Farl.), needle blight. Mass., N.H., Wis. (1); Alaska (3).

Dimerosporium tsugae Dearn., on discolored needles. N.C. (1,2); Ga., Tenn., Va. (1); Alaska, Oreg., Wash. (3); on *T. diversifolia* (Maxim.) Mast. in Tex.

Echinodontium tinctorium Ell. & Ev., brown stringy heart rot. General (3); Pacific Northwest (4).

Fomes spp., wood rot of living or dead trees and logs, especially the following:

F. annosus (Fr.) Cke., butt and root rot, white pocket heart rot. Conn. (1); Idaho, Oreg., Wash. (3). Commonly a wound rot (fire scars, sunscald, and mechanical) rather than a root parasite.

F. applanatus (Pers. ex Fr.) Gill., white-mottled butt, root, and heart rot. Occasional (1); Oreg., Wash. (3).

F. nigrolimitatus (Rom.) Egel., white pocket rot. Oreg. (4).

F. officinalis (Vill. ex Fr.) Faull, brown cubical trunk rot. Oreg., Wash. (3); Idaho (4).

F. pini (Brot. ex Fr.) Karst., red ring rot, conk rot. General (3); Idaho, Oreg. (4).

F. pini, including var. *abietis* Karst., red ring rot, white pocket heart rot. New England to Tenn. (1).

F. pinicola (Sw. ex Fr.) Cke., brown cubical trunk rot. Widespread (1,4); general (3).

F. robustus Karst. (*F. hartigii* Allesch.), white spongy rot. Oreg., Wash. (3).

F. robustus var. *tsugina* Baxter—Common on (1,3).

F. roseus (Alb. & Schw. ex Fr.) Cke., brown cubical trunk rot. Maine to W. Va. (1).

F. subroseus (Weir) Overh., brown cubical rot of logs and timber. N.Y., Pa., Va. (1); Northwestern States (3).

Ganoderma lucidum (Leyss. ex Fr.) Karst. (*G. tsugae* Murr.), white spongy sapwood and heart rot. Northeastern States to Ind. and Wis. (1).

G. oregonense Murr., white spongy rot. Oreg. (3); Idaho (4).

Gelatinosporium abietinum Pk.: See *Dermatea balsamea.*

Herpotrichia nigra Hartig, snow blight. Mont. to Oreg. and Alaska (4).

Hydnum abietis Hubert, long pocket rot. Oreg., Wash. (3).

Hymenochaete agglutinans Ell., stem girdle of saplings. Pa. (1).

Lenzites betulina L. ex Fr., white sapwood rot. N.Y. (1).

L. saepiaria Wulf. ex Fr., brown cubical rot of logs and timber. Widespread (1); Idaho, Wash. (3).

L. trabea Pers. ex Fr., brown cubical rot of logs and timber. Widespread (1).

Melampsora abietis-canadensis (Farl.) C.A.Ludwig (O,I), needle and cone rust. New England to Pa. and Wis., N.C. (1); Conn. (2). II and III on *Populus* spp.

M. farlowii (Arth.) J.J.Davis (III), needle and cone rust. New England to N.C. and Wis. (1); N.C. (2). *T. caroliniana* less susceptible than *T. canadensis.*

Micropera abietina (Pk.) Hoehn.: See *Dermatea balsamea.*

Mycosphaerella tsugae (Pk.) House, on cone scales. N.Y. (1).

Oxyporus nobilissimus W.B.Cooke, butt rot. Wash. (3).

Phacidium tsugae Cash & Davidson, on discolored needles. N.C. (1).

?Phaeocryptopus nudus (Pk.) Petr.: See *Adelopus nudus.*

Pholiota adiposa Fr., brown-mottled butt rot. Idaho (3).

Phomopsis occulta Trav., on blighted twigs. Mass., N.J., N.Y. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. On cultivated specimens of *T. diversifolia* in Tex.

Polyporus spp., sapwood rot of standing or fallen trees, sometimes heart rot of living trees, especially the following:

P. abietinus Dicks. ex Fr., white sapwood rot. General (1,3).

P. albidus Pk.—N.Y. (1).

P. alboluteus Ell. & Ev.—Idaho (3).

Polyporus amorphus Fr., brown stringy rot. Pa. (1); Idaho, Oreg. (3).
P. anceps Pk., red ray rot. Mass. (1).
P. borealis Fr., brown cubical rot. Mass., N.Y., Tenn., Va. (1); Mont. (3).
P. caesius Schrad. ex Fr.—Maine (1), Idaho (3).
P. cinnabarinus Jacq. ex Fr.—Pa., Vt. (1).
P. circinatus Fr., white root and butt rot. N.Y., Wis. (1); Idaho (3).
P. dichrous Fr.—N.Y. (1).
P. dryadeus Pers. ex Fr., white root and butt rot. Mont. to Oreg. and Wash. (3,4).
P. dualis Pk.—N.Y. (1).
P. fibrillosus Karst.—N.Y., Tenn. (1); Idaho (3).
P. fissus Berk.—Mich. (1).
P. fragilis Fr.—N.Y. (1).
P. gilvus (Schw.) Fr.—Pa. (1).
P. guttulatus Pk.—N.Y. (1), Idaho (3).
P. hirsutus Wulf. ex Fr.—N.Y. (1).
P. lapponicus Rom.—Idaho (3).
P. melanopus Fr.—Idaho (3).
P. prolificans Fr.—N.Y., Pa. (1).
P. resinosus Schrad. ex Fr.—Maine, Tenn., Vt. (1); Wash. (3).
P. schweinitzii Fr., red-brown butt and heart rot. Idaho, Oreg., Wash. (3); Mont., Oreg. (4).
P. spraguei Berk. & Curt.—N.Y. (1).
P. spumeus Sow. ex Fr.—Maine (1).
P. subpendulus (Atk.) Sacc. & Trott.—N.Y. (1).
P. sulphureus Bull. ex Fr., brown cubical heart rot. Reported on (1); Oreg., Wash. (3).
P. tulipiferus (Schw.) Overh.—Vt. (1).
P. undosus Pk.—N.Y. (1).
P. versicolor L. ex Fr.—Widespread (1); general (3).
P. volvatus Pk.—Wash. (3).
Poria spp., wood rot, chiefly of fallen trees, logs, and timber, especially the following:
P. colorea Englerth, yellow root rot, spongy butt rot. Oreg., Wash. (3).
P. incrassata (Berk. & Curt.) Burt, dry rot of timber. Widespread (1).
P. subacida (Pk.) Sacc., white spongy rot, feather rot. Northeastern States to Tenn. (1); Idaho, Wash. (3).
P. tsugina (Murr.) Sacc. & Trott., white spongy rot. Northeastern States to Tenn. (1); Idaho, Wash. (3).
P. vaillantii (Fr.) Cke., dry rot of timber. Widespread (1).
P. weirii Murr., root and heart rot. Wash. (3).
Pucciniastrum hydrangeae (Berk. & Curt.) Arth. (O,I), needle rust. Ind., Md., N.C., Pa., Tenn., Va. (1). II and III on *Hydrangea arborescens* L.
P. myrtilli (Schum.) Arth. (O,I), needle rust. Maine to Ala., Ind., and Wis. (1); N.C. (2). II and III on Ericaceae.
Rhizina undulata Fr., seedling root rot. N.Y. (1), Idaho (3). Commonly cited in the pathological literature as *R. inflata* (Schaeff.) Karst.
Rhizoctonia solani Kuehn, damping-off. Cosmopolitan (1).
Rosellinia herpotrichioides Hepting & Davidson, needle blight. N.C. (1).
Schizophyllum commune Fr., wood rot. Calif. (3).
Stereum spp., white pocket rot of logs, slash, and timber, especially the following:
S. chailletii Pers. ex Fr.—Pacific Northwest (3).
S. radiatum Pk.—Pa., Va., Wis. (1).
S. sanguinolentum Alb. & Schw. ex Fr., brown cubical sapwood and heart rot. Widespread (1); Pacific Northwest (3); Idaho, Mont., Wash. (4).
S. sulcatum Burt—Pa., Vt., Wis. (1); Pacific Northwest (3); Idaho, Mont., Wash. (4).
Thelephora caryophyllea Schaeff. ex Fr., on seedlings. Idaho (3).
Trametes spp., rot of logs and slash, sometimes of timber, especially the following:
T. americana Overh.—Maine, Wis. (1).
T. carbonaria (Berk. & Curt.) Overh.—N.Y., Pa. (1).
T. tenuis Karst. (*T. isabellina* Fr., *Poria isabellina* (Fr.) Overh.), white pocket rot. N.Y. (1); Alaska, Idaho (3).
T. heteromorpha (Fr.) Lloyd—Maine, N.Y., Va. (1).
T. sepium Berk.—N.Y. (1).
T. serialis Fr.—Maine, N.Y., Pa. (1); Idaho, Wash. (3). In part = *Poria microspora* Overh.
Uraecium holwayi Arth. (O,I), needle rust. Alaska, Oreg., Wash. (3); Idaho, Mont. (4).
Valsa abietis Fr., on branches. Va., W. Va. (1).

PIPERACEAE

Piper, pepper

Piper spp.

Shrubs, climbers, and herbs of tropical regions, some of which are cultivated for ornament in the American Tropics but only seldom including the *Piper* spp. of commerce, such as *P. nigrum* L., black pepper, and *P. cubeba* L. f., cubeb.

Cephaleuros virescens Kunze, green scurf, algal spot. P.R.
Cercoseptoria piperis (F.L.Stevens & Dalbey) Petr., leaf spot. P.R.
Cercospora piperis Pat., leaf spot. P.R.
C. portoricensis Earle—C.Z., P.R.
Cyclodothis pulchella Syd., black leaf spot. P.R.
Glomerella cingulata (Ston.) Spauld. & Schrenk—P.I.
Guignardia pipericola F.L.Stevens, leaf spot. P.R., V.I.
Irenina glabra (Berk. & Curt.) F.L.Stevens and *I. glabroides* F.L.Stevens, black mildew. C.Z., P.R.
Irenopsis piperis (Earle) F.L.Stevens and *I. tortuosa* (Wint.) F.L.Stevens, black mildew. C.Z., P.R.
Meliola contorta F.L.Stevens and *M. paucipes* F.L. Stevens, black mildew. P.R.
Omphalia flavida (Cke.) Maubl. & Rangel, leaf spot. P.R.
Podosporium effusum Pat., on leaves. P.R.
Rosellinia bunodes Berk. & Br., root rot. P.R.
Sclerotium rolfsii Sacc., southern wilt. Fla. (on *P. nigrum*).
Stigmatea piperis Rehm, on leaves. V.I.

PITTOSPORACEAE

Pittosporum

Pittosporum spp.

Evergreen shrubs or trees of East Asia to Australia and the Pacific Islands; grown for ornament in warm countries. In the United States *P. tobira* Ait., Japanese Pittosporum, is commonly grown in the Far South for hedges; several Australian species of tree form are cultivated in California; *P. crassifolium* Cunn., karo, *P. daphniphylloides* Hay., and *P. viridiflorum* Sims, Cape Pittosporum, treelike shrubs, are also grown in California.

Cercospora pittospori Plakidas, angular leaf spot. S.C. to Tex.
Diplodia sp., foot rot. Fla.
D. pittospori Cke. & Harkn., on twigs. Calif.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.
Mycosphaerella pittospori Cke., on leaves. Calif., S.C.
Pellicularia koleroga Cke., thread blight. La.
Phomopsis pittospori (Cke. & Harkn.) Grove, on twigs. Calif.
Phyllosticta sp., leaf spot. Ala.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora rhodina (Berk. & Curt.) Cke., on branches. Fla.
Rhizoctonia ramicola D.A.Roberts, thread blight. Fla.
Sclerotium rolfsii Sacc., southern wilt. Fla., Tex.
Verticillium albo-atrum Reinke & Berth., wilt. Calif.

MOSAIC—undetermined virus. On *P. daphniphylloides* in Calif.

?ROUGH BARK—undetermined virus. Calif.

VARIEGATION—?virus. Variegated forms of *P. tobira* are in cultivation; transmission of the anomaly by grafting has been reported in France but not demonstrated in the United States.

PLANTAGINACEAE

Plantago, plantain

(1) *P. aristata* Michx., bracted plantain.
(2) *P. eripoda* Torr.
(3) *P. lanceolata* L., ribgrass, English plantain, buckhorn.
(4) *P. major* L., common plantain, whitemansfoot.
(5) *P. maritima* L.
(6) *P. purshii* R. & S.
(7) *P. rugelii* Dcne.
(8) *P. virginica* L., hoary, or pale-seeded, plantain.
(9) Other species.

Weedy herbs, in part annual and native to plains and prairies in the Central and Western States (1,6), or in the East (8); in part perennial and native or introduced (3,4,7); of seacoasts and marshes (2,5). Several species are important wildlife-food plants; *P. indica* L. (*P. arenaria* Waldst. & Kit.) is principal source of psyllium.

Aphysa plantaginis (Ell.) Th. (*Asterina plantaginis* Ell.), on leaves. Calif., Ill., Md., N.J., Pa., Va. (4); Vt., Wis. (7).
Ascochyta plantaginella Tehon, leaf spot. Ill. (7).
A. plantaginis Sacc. & Speg.—Okla. (1,4).
Cercospora plantaginella Tehon, leaf spot. N.C. (3), Ill. (7).
C. plantaginis Sacc.—Maine to Ala. and Kans. (3,4); Ind., Wis. (7); T.H. (9).
Ditylenchus dipsaci (Kuehn) Filip., stem and leaf nematode. N.Y. (3,7); Oreg. (5).
Erysiphe cichoracearum DC. (*E. lamprocarpa* Kickx), powdery mildew. Tex. (1,3,9); N.C. (3); N.Y. to Miss., Colo., and Wash. (4); Calif. (5); N.Y. to Ga., Nebr., and Mont. (7).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. (3).
Mycosphaerella columbi Rehm, leaf spot. Ohio (7).
M. plantaginicola (Cke). Dearn.—Pa. (3); N.Y. (4). Based on *Sphaeria plantaginicola* Schw., a pre-Friesian name. *M. pachyasca* (Rostr.) Vest., as reported in Maine and W.Va. (4) and N.Dak (9), is, perhaps, rather to be referred here.
Pellicularia filamentosa (Pat.) Rogers, on leafstalks. Ill. (4). SEE ALSO *Rhizoctonia solani*.
Peronospora alta Fckl., downy mildew. N.C. to Ala., Tex., and Wis. (1); Maine to N.J., Mo., and Wash. (4); Wis. (6); N.Y. to Kans. and Wis. (7); also Mont., Tex., Alaska (9). The form on (1) is sometimes distinguished as *P. plantaginis* Burr. apud Underw.; according to Shaw *P. plantaginis* is distinct and also occurs on (6).
Phoma polygramma (Fr.) Sacc. var. *plantaginis* Sacc., stem blight. N.J. (3).
Phomopsis subordinaria (Desm.) Trav., on flower stalks. Iowa (1); N.Y., Pa. (3). Said to be the conidial stage of *Diaporthe arctii* (Lasch) Nits.; appears identical with the preceding.
?*Phyllachora plantaginis* Ell. & Ev., leaf spot. Wis. (7).
Phyllosticta spp., leaf spot. Species reported include: *P. atomata* Tehon—Ill. (7); *P. plantaginella* Sacc.—N.Y. (4); *P. plantaginicola* Tehon & Daniels—Ill. (8); *P. plantaginis* Sacc.—Alaska (9).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,3,9).
Physarum cinereum (Batsch) Pers., slime mold on leaf stalks and flower stalks. Frequent on (3) and (4) in the Eastern and Central States.
Puccinia aristidae Tracy (O,I), rust. Tex. (1,9), Colo. (2). II and III on *Aristida* and other grasses.
P. pacifica Blasd. (II,III), rust. Calif. (?5). O and I unknown.
Ramularia spp., leaf spot. *R. plantaginis* Ell. & G. Martin is reported on (1,3,9) in Tex.; from Maine to Miss., Nebr., and Minn. (4); and on (7) in Ind., N.Y., Wis. *R. plantaginis* Pk., renamed *R. peckii* Sacc. & Syd., on (3) in N.Y., Oreg., and Wash. and on (8) in Nebr., has priority. *R. lanceolata* Dearn. & House, perhaps not distinct from the latter, is reported on (3) in Calif., Mass., and N.Y.
Rhabdospora continua (Berk. & Curt.) Sacc., on flower stalks. Mich., Pa. (4). SEE ALSO *Phomopsis subordinaria*.
Rhizoctonia solani Kuehn, damping-off, root rot. Ill., Tex. (1,3); Ill. (4); Tex. (9). SEE ALSO *Pellicularia filamentosa*.
Sclerotinia trifoliorum Eriks., root and stem rot. Ky., Ohio (3).
Sclerotium rolfsii Sacc., southern blight. Md. (7).
Septoria inconspicua Berk. & Br., on old leaves. Mo., Tex. (1); N.J., Tex. (3); N.Y., ?Okla. (4); Okla. (6).
S. plantaginea Pass., leaf spot. Del., Va. (4); Wis. (4,6).
Sphaceloma plantaginis Jenkins & Bitanc., spot anthracnose, scab. Maine, Mass., Okla. (4); N.Y. to Md., Ill., Okla., and Wis. (7); Ill., Ind., Iowa, Kans., Mo., Ohio, Wis. (9).
Sphaerotheca humuli (DC.) Burr. var. *humuli* (Schlecht.) Salm., powdery mildew. Wyo. (2), Wis. (4), N.J. (9).
Stigmatea plantaginis Tehon & Daniels, on old leaves. Ill. (8). SEE ALSO *Aphysa plantaginis*.
Synchytrium plantagineum Sacc. & Speg., leaf gall. Miss. (3,8); Pa., Tex. (8).
Uromyces peckianus Farl. (O,I), rust. On (1) from Ind. to Tex. and Wis.; on (2) from N.Dak. to

Nebr. and Wash.; on (6) in Nebr., Okla., Tex.; Mo. (7); and on (8) from S.C. to Tex. and Ill. II and III on *Aristida* and *Distichlis* spp.

Xanthomonas plantaginis (Thornberry & H. W. Anderson) Burkh., bacterial leaf spot. Ill .

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (9).

MOSAIC—virus (*Marmor tabaci* Holmes var. *plantaginis* Holmes). Ky., N.J., Va. (3,4).

TOBACCO STREAK—virus (*Annulus orae* Holmes, Nicotiana virus 8 K.M.Sm.). Wis. (4).

YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Pa. (4).

PLATANACEAE

Platanus, planetree

(1) *P. acerifolia* (Ait.) Willd., London planetree.

Large, deciduous tree of hybrid origin (*P. occidentalis* × *P. orientalis*), used extensively in street plantings for shade, zone 5; several horticultural varieties, some variegated, exist.

(2) *P. occidentalis* L., American planetree, buttonwood, sometimes called American sycamore.

Range 16,20,21,22,24,25,26,27,28,29,30; used in street plantings, zone 4. Several geographic varieties have distinctive names but are all included here.

(3) *P. orientalis* L., Oriental planetree.

Native of southeastern Europe and western Asia; widely grown for shade but not commonly used in street plantings, zone 6.

(4) *P. racemosa* Nutt., California sycamore or planetree. Range 3,4,5; not hardy North.

(5) *P. wrightii* S. Wats., Arizona sycamore. Range 10 and 11.

A genus of large majestic shade trees with handsome, dense foliage.

Armillaria mellea Vahl ex Fr., root rot. Md., Tex., W.Va. (2); Calif. (4).

Botryosphaeria ribis Gross. & Dug. var. *chromogena* Shear, N.E.Stevens, & M.S. Wilcox, on branches. Fla., Pa. (2).

Ceratostomella sp., strain of *C. fimbriata* (Ell. & Halst.) J.A.Elliott =*Endoconidiophora fimbriata* (Ell. & Halst.) Davidson: SEE *Endoconidiophora fimbriata* f. *platani*.

Cercospora platanicola Ell. & Ev., leaf spot. (2). Conidial stage of *Mycosphaerella platanifolia* (Cke.) Wolf.

?*Chaetosphaeria pannicola* (Berk. & Curt.) Sacc.—Ga. (2).

Cytospora platani Fckl., on twigs. New England to Va., Tex., and Iowa (2).

Daedalea ambigua Berk. and *D. confragosa* Bolt. ex Fr., wood rot. Widespread (2).

Diaporthe arctii (Lasch) Nits.—Ga. (2).

Dothiorella sp., canker. N.Y. (1).

Endoconidiophora fimbriata (Ell. & Halst.) Davidson: SEE *Endoconidiophora fimbriata* f. *platani*.

Endoconidiophora fimbriata f. *platani* Walter, London plane blight, canker stain of planetrees. Del., Ky., Md., Miss., Mo., N.C., N.J., N.Y., Ohio, Pa., Tenn., Va., W.Va. (1). Also reported as causing blight, canker, and tracheomycosis in Miss., Pa., Va., W.Va., on (2) which is less susceptible than (1). However, canker stain has been virtually eliminated from cities where it was common about 1935 and successfully controlled in others. Morphologically indistinguishable from *E. fimbriata* and separable only on the basis of host reaction; therefore, established as a new form (Phytopathology 42: 236).

Eutypella sp.—Ga. (2).

Exosporium platanorum Tharp, on leaves. Tex. (2).

Fomes applanatus (Pers. ex Fr.) Gill., white-mottled heart rot. Conn. (2).

F. pinicola (Sw. ex Fr.) Cke.—On (2), only distribution record here "North America."

F. scutellatus (Schw.) Cke.—Md. (2).

Gloeodes pomigena (Schw.) Colby, on branches. Ind. (2).

Gnomonia veneta (Sacc. & Speg.) Kleb. (*Gloeosporium nervisequum* (Fckl.) Sacc., *Gnomonia platani* Edg.), anthracnose, twig blight, canker. Calif., N.J., N.Y. (1) (somewhat resistant); general (2,3); Calif. (4).

Hendersonia desmazieri Mont. and *H. platani* Pk.: SEE *Massaria platani*.

Hydnum erinaceus Bull. ex Fr., trunk rot, sometimes on living trees. N.C. (2).

Hypoxylon spp.—Ga. (2).

?*Leptosphaeria platanicola* (Howe) Sacc.—Ga. (2).

Libertella sp., on branches. La. (2).

?*Lophiostoma caulium* (Fr.) Ces. & de N.—Ga. (2).

Massaria platani Ces., twig blight, ?canker. N.J. (1); Ga., Ind., Iowa, Kans. (2); Calif. (4).

Microsphaera alni DC. ex Wint., powdery mildew. N.J., N.Y. (1); widespread (2,3); Calif. (4).

M. alni var. *extensa* (Cke. & Pk.) Salm.—N.C. (2.)

Mycosphaerella platanifolia (Cke.) Wolf (*Cercospora platanicola* Ell. & Ev.), leaf spot. N.C. to Ga., and Tex., Iowa (2). SEE ALSO *Phyllosticta platani*.

M. stigmina-platani Wolf (*Stigmina platani* (Fckl.) Sacc.), leaf spot. N.C. (2). (*Sphaerella platani* Ell. & G.Martin, differing from this and the preceding, reported on living leaves in Kans. (2)).

Myxosporium platanicola Ell. & Ev., on branches. W.Va. (2).

Nummularia tinctor (Berk.) Ell. & Ev.: SEE "Wilt."

Oidium obductum Ell. & Langl., powdery mildew. Pa., Va., W.Va. (3).

Ophiodothella leucospila (Berk. & Curt.) J.H.Miller & G.E.Thompson, on fallen leaves. Ga. (2).

Phleospora multimaculans Heald & Wolf, leaf blight. Ind., Tex. (2).

Phomopsis scabra (Sacc.) Trav., on twigs. Ohio, Okla., W.Va. (2). Conidial stage of *Diaporthe eres* Nits.

Phoradendron sp.—Calif. (4).

P. flavescens (Pursh) Nutt., mistletoe. Okla., Tenn., Tex. (2).

P. flavescens var. *macrophyllum* Engelm., mistletoe. Ariz., N.Mex. (5).

Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Ind. (2).

Phyllosticta platani Sacc. & Speg., leaf spot. Ala., Kans., Mass., Md., Va. (2). ?Spermatial stage of *Mycosphaerella platanifolia*.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2), Ariz. (5).

Physalospora spp., on branches. Species reported include: *P. fusca* N.E.Stevens and *P. rhodina* (Berk. & Curt.) Cke.—N.C. (2); *P. obtusa* (Schw.) Cke. —Va. to La., Ga. (2).

Phytophthora cinnamomi Rands, seedling root rot. Md. (3).

Polyporus spp., wood rot. Species reported on (2) include: *P. adustus* Willd. ex Fr., *P. galactinus*

Berk., *P. gilvus* Schw., *P. hirsutus* Wulf. ex Fr., *P. lacteus* Fr., *P. rigidus* Mont., and *P. sanguineus* Fr.

P. versicolor L. ex Fr., wound rot. Md. (2).; sometimes causes heart rot—?N.Y. (2).

Septoria platanifolia Cke., leaf spot. Ga., Iowa, Md., S.C., Tex., W.Va. (2).

Sphaerella platani Ell. & G.Martin: See *Mycosphaerella stigmina-platani.*

Stereum bicolor Pers. ex Fr. and *S. purpureum* Pers. ex Fr., wood rot. Widespread (2).

S. fasciatum Schw., wood rot. Okla. (2).

Stigmella platani-racemosae Dearn. & Barth., leaf spot. Calif. (4).

Stigmina platani (Fckl.) Sacc., leaf spot. Reported on (2); Calif. (3). Conidial stage of *Mycosphaerella stigmina-platani.*

BACTERIUM—unnamed bacterium pathogenic to wood of cuttings. (Phytopathology 33:963.)

ROSY CANKER—illuminating gas in soil. N.J., N.Y. (1).

WILT, DIEBACK, BARK CANKER—cause unknown. La. (?1, ?2). *Nummularia tinctor* (Berk.) Ell. & Ev., sometimes associated but not suspected as the cause.

PLUMBAGINACEAE

Armeria

A. maritima Willd., sea-pink, thrift.

Perennial herb of the north Pacific coast and Arctic regions, grown in rock gardens.

Uromyces limonii (DC.) Lév. var. *armeriae* (Schlecht.) Arth. (O,I,II,III), rust. Calif.

Limonium, sea-lavender, statice (of gardens)

(1) *L. californicum* (Boiss.) Small
(2) *L. carolinianum* (Walt.) Britt.
(3) *L. latifolium* (J. E. Sm.) Kuntze
(4) *L. sinuatum* (L.) Mill.
(5) Other species.

Mostly perennial or biennial, sometimes woody, herbs of Europe or Asia; several species grown for ornament in rock gardens and some for cut flowers and everlastings (3,4,5); (1), of California, and (2), of salt meadows on the Atlantic and gulf coasts, are useful to wildlife.

Alternaria sp., leaf spot. Conn. (3).

Ascochyta plumbaginicola P.Henn., leaf spot. Iowa (3).

Cercospora sp., leaf spot. Tex. (2).

Fusicladium staticis Ell. & Ev., leaf spot. Tex. (5).

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. (4).

Phyllosticta sp., leaf spot. Conn. (3).

P. staticis Petr.—N.Y. (2).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (5).

Uromyces limonii (DC.) Lév. (O,I,II,III), rust. Calif. (1); Maine to Miss. and Tex. (2); Conn. (3); N.Mex., Tex. (5).

YELLOWS—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif. (1).

POLEMONIACEAE

Collomia

(1) *C. grandiflora* Dougl.
(2) *C. linearis* Nutt.

Annual herbs of the Rocky Mountain region and Pacific States; sometimes grown for ornament.

Puccinia giliae Harkn. (II,III), rust. Calif., Wash. (1). O and I unknown.

P. plumbaria Pk. (O,I,III). Nev. (2).

Sphaerotheca humuli (DC.) Burr., powdery mildew. Calif. (1); Colo., Idaho, Mont., N.Dak., Wash., Wyo. (2). Also the var. *fuliginea* (Schlecht.) Salm. in the same range (2).

Uromyces acuminatus Arth. var. *polemonii* (Pk.) J.J. Davis (O,I), rust. Colo., N.Dak., Nebr. (2). II and III on *Spartina* spp.

Gilia, gilia, skyrocket

Gilia spp.

Numerous annual or perennial herbs with showy flowers, mostly native to the Western States, especially California; several species are cultivated for ornament or are useful to wildlife.

Diplodia leptodactyli Earle, on stems. Tex.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Calif.

Peronospora giliae Ell. & Ev., downy mildew. Tex.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Pratylenchus pratensis (De Man) Filip., root nematode. Tex.

Puccinia aristidae Tracy (O,I), rust. Ariz., Colo.

P. giliae Harkn. (II,III). Ariz., Calif., Colo., Nev., Oreg., Wash. O and I unknown.

P. plumbaria Pk. (O,I,III). Calif., Colo., Nev., Utah, Wyo.

P. yosemitana Blasd. (O,III). Calif., Colo.

Ramularia giliae Sprague, leaf spot. On *G. bicolor* (Nutt.) Piper in Oreg.

Sphaerotheca humuli (DC.) Burr., powdery mildew. Calif., Tex., Wash.

YELLOWS—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif.

Microsteris

(1) *M. gracilis* (Dougl.) Greene
(2) *M. micrantha* (Kellogg) Greene

Annual herbs of the Rocky Mountain and Pacific States, useful to wildlife.

Peronospora phlogina Diet. & Holw., downy mildew. Idaho (1).

Puccinia plumbaria Pk. (O,I,III), rust. Mont. to Colo., Calif., and Wash. (1,2).

Sphaerotheca humuli (DC.) Burr., powdery mildew. Wash. (1,2), Calif. (2).

S. humuli var. *fuliginea* (Schlecht.) Salm.—Mont. (1).

Phlox

(1) *P. carolina* L. (*P. suffruticosa* Vent.), thick-leaf phlox.
(2) *P. divaricata* L., wild sweet-william.

(3) *Phlox drummondii* Hook.
(4) *P. maculata* L., meadow phlox.
(5) *P. paniculata* L., summer perennial phlox; including horticultural forms and hybrids collectively termed *P. decussata* Hort.
(6) *P. pilosa L.*
(7) *P. subulata* L., ground- or moss-pink.
(8) Other species.

Annual (3) and numerous perennial herbs with showy flowers, widely distributed in temperate North America. Several species are commonly cultivated for ornament (2,5,7); others are occasionally cultivated or hybridized with cultigens (1,4,6).

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. N.J. (5).
Aphelenchoides fragariae (Ritz.-Bos) Christie, leaf nematode. Md. (1,3,5).
Ascochyta phlogis Vogl. var. *phlogina* Fairm., leaf spot. N.Y. (3); Mass., Tex. (5).
Botrytis cinerea Pers. ex Fr., gray mold. Alaska (5,8).
Cercospora omphakodes Ell. & Holw., leaf spot. Iowa (1); N.Y. to Iowa and Wis. (2,?5); Okla., Wis. (6); Ala., W.Va. (8).
C. phlogina Pk.—Minn., N.Y., Va. (5); Miss. (8).
Colletotrichum sp., stem canker. Fla. SEE ALSO *Pyrenochaeta* and *Vermicularia.*
Corynebacterium fascians (Tilford) Dows., fasciation. Calif. (5).
Ditylenchus dipsaci (Kuehn) Filip., leaf and stem nematode. Calif., Conn., Md., N.J., N.Y., Ohio, Wash. (5); Md. (7).
Erysiphe cichoracearum DC., powdery mildew. Ind., N.Y., Ohio, Wis. (2); general (3,5) but resistance in some horticultural varieties is reported; Mich. (4).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Leptosphaeria phlogis Oud.: SEE *Septoria phlogis.*
Lophodermium phloxii Bonar & W.B.Cooke, on leaves. Calif. (8).
Macrophoma cylindrospora (Desm.) Berl. & Vogl., leaf spot. Calif. (8).
Meloidogyne spp., root knot nematodes. Md. (3); Kans., Mass., N.J., Ohio, Tex., Wash. (5).
Mycosphaerella sp. (*Sphaerella phlogina* Ell. & Ev.), on leaves. Mont., N.Y. (8).
Peronospora phlogina Diet. & Holw., downy mildew. Iowa, Wis. (2).
Phyllosticta sp., leaf spot. Wash. (5).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (5).
Puccinia douglasii Ell. & Ev. (O,I,III), rust. N.J., Pa. (7); Colo., Mont., Nebr., N.Mex., Oreg., Utah, Wash., Wyo. (8).
P. plumbaria Pk. (O,I,III)—Ill., Iowa, Mo. (2); Iowa (5,6); Tex. (6); Wyo. to N.Mex., Calif., and Wash. (8).
Pyrenochaeta phlogis (*phloxidis*) Mass., stem blight. N.Y. (5). SEE ALSO *Colletotrichum* and *Vermicularia.*
Ramularia sp., leaf spot. Wash. (5).
Rhizoctonia solani Kuehn, stem rot. Minn., N.J., N.Y. (5).
Sclerotium rolfsii Sacc. (including *S. delphinii* Welch), southern blight, stem rot. Conn. (2); Md., N.J., N.Y., Ohio, Tex., Va. (5); Conn., Fla., Ill. (7).
Septoria spp., leaf spot. Not critically delimited but reported as follows: *S. divaricata* Ell. & Ev.—Ill., Iowa, N.Y., Wis. (2); Maine to Miss., Tex., and Wis. (5). *S. drummondii* Ell. & Ev.—Conn., Fla., Mich., Pa., and Alaska (3). *S. phlogis* Sacc. & Speg.—Ind., Iowa, N.J., Wis. (2); N.Y. (3); Conn., Iowa, Mich., Nebr., N.J., W.Va. (5). Most authorities distinguish *S. divaricata* and *S. phlogis.* The reputed connection of the latter with *Leptosphaeria phlogis* has not been confirmed.
Sphaerotheca humuli (DC.) Burr., powdery mildew. Kans., N.H., N.Y., Ohio, Wash. (5).
Uromyces acuminatus Arth. var. *polemonii* (Pk.) J.J. Davis (O,I), rust. Iowa, Minn. (2); Iowa, Miss., Tex. (5); Ill., Iowa, S.Dak., Wis. (6).
Vermicularia phlogina Fairm., on old stems and leaves. Conn. (2,5); Md. (5); N.Y. (5,7); Miss., W.Va. (8). Perhaps not distinct from *V. dematium* Pers. ex Fr. (=*Colletotrichum dematium* (Fr.) Grove). SEE ALSO *Pyrenochaeta.*
Verticillium albo-atrum Reinke & Berth., wilt. Minn. (1), N.Y. (3,5).
Volutella phlogina Ell. & Langl., leaf spot. La. (5).
MOSAIC—suspected virus. Md., N.Y., N.C. (5).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Del., N.J., N.Y., Pa. (3); also var. *californicus* Holmes in Calif. (3).
LEAF DROP, BLIGHT—cause unknown. Believed to be primarily physiological although fungi—(*Phoma, Pleospora, Vermicularia* spp.)—are often present as secondary agents; attributed in part to exhaustion of nutrients and production of new shoots on old stems. Frequent on (5) in Middle Atlantic States.

Polemonium

(1) *P. caeruleum* L., Jacobs-ladder, Greek valerian, charity.
(2) *P. pulcherrimum* Hook.
(3) *P. reptans* L.
(4) Other species.

Perennial herbs with attractive flowers: Introduced from Europe (1) or native species of the Western States (2) or of the Eastern and South Central States (3). All are of ornamental value; (1) is most commonly cultivated.

Cercospora omphakodes Ell. & Holw., leaf spot. Pa. (3).
Erysiphe cichoracearum DC., powdery mildew. Utah (4).
Fusarium sp., wilt. N.J. (4).
?Phyllachora polemonii Harkn., on leaves. Calif. (2).
Puccinia gulosa Jacks. (III), rust. Calif. (2).
C. polemonii Diet. & Holw. (III)—Idaho, Ind. (3); Calif., Idaho, Alaska (4).
Pyrenophora polyphragmoides Sacc. & Scalia, on dead stems and leaves. Alaska (2).
Septoria polemonii Thuem., leaf spot. Mo., Wis. (3).
S. polemoniicola Ell. & G. Martin—Conn., Ind., Mo. (3).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Wash. (4).
Uromyces acuminatus Arth. var. *polemonii* (Pk.) J.J. Davis (O,I), rust. Ill., Ind., Iowa, Wis. (3).
Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (4).

POLYGALACEAE

Polygala, milkwort

(1) *P. cruciata* L.
(2) *P. lutea* L.
(3) *P. paucifolia* Willd., fringed Polygala, flowering wintergreen, bird-on-the-wing.
(4) *P. sanguinea* L.

(5) Other species.

Numerous native herbs, some of ornamental value, of the Eastern and Central States and southward; also exotic shrubs grown for ornament mostly in the South and in California; (1,2,3,4) representative of the herbaceous species.

Aecidium renatum Arth. (O,I), rust. N.Mex. (5).
Cercospora grisea Cke. & Ell., leaf spot. N.J. (1), Miss. (2,4), Va. (5).
Gloeosporium ramosum Ell. & Ev., anthracnose. Ind., N.J., Wis. (5).
Phoma polygalae Cke. & Harkn., on stems. Calif. (5).
Phomatospora berkeleyi Sacc., on stems. Calif. (5).
?Phyllachora polygalae (Schw.) Sacc., on leaves. Fla. (5).
Puccinia andropogonis Schw. var. *polygalina* Arth. (O,I). Iowa, Mich., Wis. (5). II and III on *Andropogon* spp.
P. pyrolae Cke. (III), rust. Conn., Maine, Mich., Minn., N.H., N.Y., Wis. (3).
Septoria consocia Pk., leaf spot. Ind., Mich. (5).
S. polygalae Pk. & G.W.Clint—N.Y. (3).

Securidaca

Securidaca spp.

Erect or trailing shrubs and vines of tropical America and Africa, sometimes grown for ornament.

Meliola bicornis Wint., black mildew. P.R.
Morenoella whetzelii Toro, black mildew. P.R.
Phyllachora perforans (Rehm) Sacc. & Syd. and *P. securidacae* P. Henn., on leaves. P.R.

POLYGONACEAE

Brunnichia

B. cirrhosa Gaertn., buckwheat-vine, ladies-eardrops.

Shrubby, climbing plant. Range 25,28,29,30.

Leptothyrium brunnichiae Tehon—Ill.
Physalospora ?fusca N.E.Stevens, on stems. La.

Coccoloba (*Coccolobis*)

(1) *C. grandifolia* Jacq., moralon.
(2) *C. laurifolia* Jacq. (*C. floridana* Meisn.), doveplum.
(3) *C. uvifera* (L.) Jacq., seagrape.
(4) Other species.

Small (2,3) trees of Florida Keys and West Indies to large (3) trees in the Greater Antilles and Central America; (3) planted for its attractive foliage.

Asterina coccolobae Ferd. & Winge, black leaf patch. V.I. (3).
Cephaleuros virescens Kunze, algal spot. P.R. (4).
Clypeotrabutia (*Trabutia*) *portoricensis* (F.L.Stevens) Seaver & Chardon, leaf spot. P.R. (4).
Irenopsis rectangularis F.L.Stevens, black mildew. P.R. (4).
Lembosia spp. (*L. coccolobae* Earle., *L. philodendri* P. Henn., *L. portoricensis* Ryan, *L. tenella* Lév.), black mildew. Fla., P.R. (1,2,3).
Lembosidium portoricense Speg., black mildew. P.R. (4).
Melasmia coccolobae F.L.Stevens, on leaves. P.R. (4).
Meliola amphitricha Fr. and *M. praetervisa* Gaill., black mildew. C.Z., P.R. (4).
Microclava coccolobae F.L.Stevens, on leaves. P.R. (4).
?Oudemansiella canari (Jungh.) Hoehn.—Fla. (1).
Pestalotia coccolobae Ell. & Ev., on leaves. Fla., P.R. (3).
Phyllachora simplex Starb., black leaf spot. P.R. (2).
Phyllosticta coccolobae Ell. & Ev., leaf spot. P.R. (3).
Scolecopeltis pachyasca Speg., on leaves. P.R. (2).
Seynesia coccolobae Ryan, black leaf spot. P.R. (2).
Uredo coccolobae P.Henn. and *U. uviferae* Syd. (II), rust. Fla., P.R. (3).
Verticicladium effusum Earle, on leaves. Fla. (3).

Eriogonum

(1) *E. fasciculatum* Benth.
(2) *E. umbellatum* Torr.
(3) Species not determined or not designated.

Annual or perennial herbs and some shrubs, mostly occurring on dry plains and foothills in the West from Nebraska to Texas and California, less commonly northward. The herbaceous and some of the woody species are of limited forage value to sheep and are important to wildlife; (1) is a valuable honey plant; (2) and a few other species are grown for ornament in wild gardens.

Cercospora eriogonii Ell. & Ev., on leaves. On *E. molle* Greene in Calif.
C. rubella Cke.—On *E. tomentosum* Michx. in S.C.; Tex. (3).
Cuscuta californica Chois., strangle-weed. Calif. (1). Harbors a latent virus, *Marmor secretum* Bennett, having a considerable host range among crop plants.
Erysiphe cichoracearum DC., powdery mildew. On *E. elatum* Dougl. in Wash.
E. polygoni DC.—On *E. marifolium* Torr. & Gray in Calif.; Tex. (3).
Gloeosporium eriogoni Ell. & Ev., leaf spot. Colo. (1).
Hendersonia eriogoni Fairm., on stems. N.Mex.
Heterosporium sphaeriiforme Ell. & Ev., on stems. Colo.
Leptostromella eriogoni Earle, on stems. Nev.
Peronospora sp., downy mildew. On *E. blissianum* H.L. Mason in Calif.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Puccinia aristidae Tracy (O,I), rust. On *E. trichopodes* Torr. in Ariz.
Pyrenophora eriogoni Earle, on stems. Colo.
Uromyces intricatus Cke. (O,I,II,III), rust. Ariz., Calif. (1); on numerous species from N. Dak. to Tex., Calif., and Wash.

Fagopyrum

F. esculentum Moench, common buckwheat.

Annual herb of central Asia, cultivated as a cereal and soiling crop; important honey plant; locally escaped in the Northern States.

Alternaria tenuis Auct., seed mold, secondary leaf spot. Iowa, Minn., Vt.
Ascochyta bresadolae Sacc. & Syd., leaf spot. Conn., Pa., Wis.
A. fagopyri Bres.—N.Y., Vt.
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y.
Erysiphe polygoni DC., powdery mildew. Calif.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Tenn.
Phomopsis fagopyri Trav., on stems. Del.
Phyllosticta polygonorum Sacc., leaf spot. Del., N.J., Pa., W.Va.
Ramularia anomala Pk., leaf spot. Conn., Ind., Wis. Perhaps a growth stage of *R. rufomaculans* Pk. reported on this host in Conn., Mich., Pa., and W.Va.; also reported as *Septocylindrium rufomaculans* (Pk.) Pound & Clements.
Rhizoctonia solani Kuehn, damping-off, root rot. Minn., N.C., Wash.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Del.
MOSAIC—unidentified virus. N.J., N.Y.
YELLOWS—virus (*Chlorogenus callistephi* Holmes, *Callistephus* virus 1 K.M.Sm.). N.J.

Homalocladium

H. platycladum (Meissn.) Bailey, ribbon-bush, centipedeplant.

Shrub of the Solomon Islands, grown as a novelty pot plant or in the open in the Far South.

Cephaleuros virescens Kunze, green scurf. P.R.
Erysiphe polygoni DC., powdery mildew. N.Y., Pa., Wis.

Oxyria

O. digyna (L.) Hill, mountain-sorrel.

Arctic or alpine perennial herb, sometimes grown in rock gardens.

Puccinia oxyriae Fckl. (II,III), rust. Calif., Colo., Idaho, Oreg., Utah, Alaska. O and I unknown.
Ustilago vinosa (Berk.) Tul., floral smut. Calif., Colo., Wash., Wyo., Alaska.

Polygonum

I. Section *Avicularia*, Knotweed, Knotgrass

(1) *Polygonum aviculare* L., knotweed.
(2) *P. erectum* L.
(3) *P. ramosissimum* Michx., bushy knotweed.
(4) Other species.

Mostly annual herbs of waste ground, usually on sandy but sometimes on saline soil: (1) a weed of cosmopolitan distribution; (2) of the Eastern and Central States; and (3) of the West. Most of these species are food plants for wildlife.

Cercospora avicularis Wint., leaf spot. N.Y. to Ala., Tex., and N. Dak. (1); Iowa, Minn., S. Dak., Wis. (2); Iowa, Kans., Nebr. (3).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (1).
Erysiphe polygoni DC., powdery mildew. General (1, 2); Iowa, Nebr., N. Mex., S. Dak., Wis. (3); N. Mex., Utah, Wyo. (4).
Melanopsichium austro-americanum (Speg.) G.Beck, inflorescence smut, smut gall. Calif. (1).
M. pennsylvanicum Hirsch.—N.Y. (1).
Ovularia rigidula Del., leaf spot. Ind., Nebr. (1); Wis. (1,2).
Peronospora americana Gäum., downy mildew. Ill., Nebr. (3).
P. polygoni A.Fisch.—Iowa (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Puccinia aristidae Tracy (O,I), rust. Colo., Del., N. Dak., Nebr., S. Dak. (1); Colo. (2,3). II and III on various grasses.
Ramularia rufomaculans Pk., leaf spot. Iowa (1).
Septoria polygonorum Desm., leaf spot. Minn., Wis. (1,2); N. Mex. (4).
Uromyces polygoni (Pers.) Fckl. (O,I,II,III), rust. General (1,2,3). Calif., Colo., La., Maine, Mass. (4).
Ustilago utriculosa (Nees) Tul., seed smut. Calif. (1), Miss. (2).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1).

II. Section *Bistorta*, Bistort, Snakeweed

(1) *Polygonum bistorta* L.
(2) *P. bistortoides* Pursh
(3) *P. viviparum* L., alpine bistort.

Perennial herbs, typically boreal or alpine: (1) of Europe, used pharmaceutically; (2) and (3) occur at high altitudes in the Northern and Western States, furnish food for wildlife.

Bostrichonema alpestre Ces., on leaves. Colo., Wash. (2); Wyo., Alaska (3).
Kellermania polygoni Ell. & Ev., on stems. Calif. (species not designated).
Pseudopeziza bistortae (DC. ex Fr.) Fckl., leaf spot. Alaska (3).
Puccinia bistortae (Strauss) DC. (II,III), rust. Alaska (1); Mont. to N. Mex., Calif., and Wash. (2); Colo., N.H., Wyo., Alaska (3). O and I on Umbelliferae.
P. septentrionalis Juel (II,III), rust. Alaska (3). O and I on *Thalictrum*.
Spacelotheca borealis (Clint.) Schellenb., seed or covered smut. Colo., Wash., Wyo. (2).
Stigmatea polygonorum Fr., on leaves. Calif. (3).
Ustilago bistortarum (DC.) Koern., leaf smut. Nev., Utah, Wash. (2); Colo., Wyo., Alaska (3).

III. Section *Echinocaulon* (*Tracaulon*), Tearthumb, Teargrass, Scratchgrass

(1) *Polygonum sagittatum* L., arrow-leaved tearthumb.

Annual (1) or perennial bog herbs of the Eastern and North Central States; wildlife-food plants.

Cercospora avicularis Wint. var. *sagittati* Atk. (=*C. polygonacea* Ell.), leaf spot. Ala. (1).
Sphacelotheca hydropiperis (Schum.) d By., seed or covered smut. Maine to N.C., Ill., and Wis. (1).
Ustilago utriculosa (Nees) Tul., floral smut. N.Y. (1).

IV. Section *Persicaria*, Smartweed

(1) *Polygonum amphibium* L.
(2) *P. hydropiper* L., common smartweed.
(3) *P. lapathifolium* L.
(4) *P. orientale* L.
(5) *P. persicaria* L., ladysthumb, heartsease.
(6) Other species.

Annual or perennial herbs typically of moist, boggy, or aquatic habitats, distributed throughout temperate North America. Some are troublesome weeds in meadows and cultivated fields (2,3,4); some (1) and (4) are grown for ornament in pools and old gardens; most species are important food plants for wildlife.

Ascochyta biguttulata Daniels, leaf spot. Okla. (5).
Cercospora avicularis Wint., leaf spot. Ala., Tex. (3);

Okla., Tex. (6). Other Cercospora spots variously identified as *C. effusa* (Berk. & Curt.) Ell., *C. hydropiperis* Thuem., and *C. polygonorum* Cke., which are regarded as synonymous by some authorities, have been reported throughout the Eastern, Southern, and Central States. *C. effusa* has priority. SEE ALSO *Didymaria*.

Corticium microsclerotia Weber: SEE *Pellicularia filamentosa*.

Cuscuta spp., especially *C. polygonorum* Engelm., dodder. On various species in the Eastern and Central States. *C. gronovii* Willd. is also reported on various species in N.Y.

Diaporthe arctii (Lasch) Nits., on dead stems. Ga., La. (6).

Didymaria effusa (Berk. & Curt.) Solheim, leaf spot. Conn. to Ala., Mo., and Mont. (2,3,5,6). Includes *Cercospora hydropiperis* and *C. polygonorum* according to some authorities.

Diplodia polygonicola Pk., on stems. Kans. (3).

Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (5).

Erysiphe polygoni DC., powdery mildew. Pa. (2); Mont., N.Y. (5); Ga., Iowa (6).

Gloeosporium polygoni Dearn. & House, leaf spot. Mass. (5), N.Y. (6).

Gnomoniella eccentrica (Cke. & Pk.) Sacc., on leaves. N.Y. (1).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

H. schachtii A.Schmidt, root gall. Calif. (3), Utah (6).

Macrophoma sp., on stems. Md. (6).

M. pulchrispora (Pk. & G.W.Clint.) Sacc.—N.Y. (6).

Melanopsichium austro-americanum (Speg.) G.Beck, inflorescence smut, smut gall. Calif., Tex. (3).

M. pennsylvanicum Hirsch.—Del., Ill., Ind., Iowa, Kans., Ky., Mo., N.J., N.Y., Ohio, Okla., Va., Wyo. (3,6). Two varieties have been distinguished: var. *besseyanum* Zundel—Md. (2); Ill., Mo., N.Y., Wyo. (3); and var. *caulicola* Zundel—N.Y. (3).

Meloidogyne spp., root knot nematodes. Ark. (3); on *P. hydropiperoides* Michx. in ?S.C.

Mycosphaerella sp. (*?M. polygonorum* (Crié) Lind), leaf spot. Ill. (1), N.Y. (6).

Nitschkia polygoni Tehon & Daniels, on stems. Ill. (6).

Pellicularia filamentosa (Pat.) Rogers (*Corticium microsclerotia* Weber), web blight. Fla. (6).

Phyllosticta polygonorum Sacc., leaf spot. Wis. (1), Ill. (6).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3,5,6).

Physalospora obtusa (Schw.) Cke., on stems. Ala., N.J. (6).

Puccinia polygoni-amphibii Pers. var. *persicariae* (Strauss) Arth. (II,III), rust. General east of the Rocky Mountains and in the Pacific States on (1, 2,3,5) and related species, such as *P. muhlenbergii* (Meissn.) S.Wats., *P. pensylvanicum* L., and *P. punctatum* Ell. O and I on *Geranium* spp.

P. polygoni-amphibii var. *tovariae* Arth.—On *P. pensylvanicum* in La.

Ramularia rufomaculans Pk. (*Septocylindrium rufomaculans* (Pk.) Pound & Clements), leaf spot. Ind., Kans., Md., N. Dak., Nebr., N.Y., Wis. (1,2,5,6).

Septoria polygonorum Desm., leaf spot. Maine to Miss., Kans., and Wash. (2,3,4,5,6). *S. polygonicola* (Lasch) Sacc., reported in Mich. (2) and Ill. (6), is probably synonymous; *S. polygonina* Thuem. is reported in Wash. (3), and in N.Y. and Alaska (6).

Sphacelotheca borealis (Clint.) Schellenb., inflorescence smut. Calif., Oreg. (6).

S. hydropiperis (Schum.) d By., seed smut, covered smut. Conn. to Va., Nebr., and Wash. (2,5,6). Reported also as *Ustilago hydropiperis* (Schum.) Schroet.

Ustilago hydropiperis (Schum.) Schroet.: SEE *Sphacelotheca hydropiperis*.

U. tenuispora Cif.—On *P. punctatum* in Fla.

U. utriculosa (Nees) Tul., inflorescence smut, loose smut. Maine to Ala., Tex., and Wash. (1,2,3,5,6).

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1,3,5,6).

YELLOWS—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif. (5).

V. Section *Tiniaria*, Climbing False-Buckwheat, Bindweed, Nimblewill, Fleeceflower

(1) *Polygonum convolvulus* L., corn bindweed, black bindweed.
(2) *P. cuspidatum* Sieb. & Zucc., Japanese knotweed, or fleeceflower.
(3) *P. dumetorum* L.
(4) *P. scandens* L., climbing false-buckwheat.
(5) Other species.

Annual or perennial vines, or coarse, often woody, perennial herbs; mostly of central Asia or Europe but widely naturalized in the United States: (1) a cosmopolitan annual weed; (2) sometimes grown for ornament but has widely escaped; (3) and (4) are food plants for wildlife.

Ascochyta biguttulata Daniels, leaf spot. Ill. (1).

Cercospora beticola Sacc., leaf spot. Iowa (1).

C. polygonacea Ell. & Ev., leaf spot. Ill., Iowa, Miss., N.J., Ohio, Tex. (1); Md., N.J. (3); Ala., Tex. (4).

Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (1).

Erysiphe polygoni DC., powdery mildew. Ind. (1).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Leptosphaeria fusispora Niessl, on stems. N.Y. (2).

Meloidogyne sp., rot knot nematodes. Wis. (1).

Peronospora polygoni A. Fisch., downy mildew. Ind., Iowa, Ohio, N. Dak. (1); Ill., Ind., Iowa, Kans., Ky., Nebr., N.Y., Ohio, Wis. (3,4). Also reported as *P. polygoni* Thuem., a nomen nudum, and *P. rumicis* Cda. (doubtful).

Pratylenchus sp., root nematode. Oreg. (1).

Pseudomonas polygoni (Thornberry & H.W.Anderson) Burkh., bacterial spot. Ill. (1).

Puccinia parca Arth. (II,III), rust. N.C., N.J., N.Y. (4).

P. polygoni-amphibii Pers. var. *convolvuli* (Alb. & Schw.) Arth. (II,III), rust. Eastern and Central States to Fla., Tex., and N. Dak. (1,3,4,5). O and I on *Geranium* in Europe, not known in U.S.

Ramularia anomala Pk., leaf spot. Ind., Nebr., Wis. (1,4). Perhaps a growth stage of *R. rufomaculans* Pk.

R. cilinodis J.J.Davis, leaf spot. Pa., Wis. (5).

Rhizoctonia solani Kuehn, root rot. Wash. (1).

Septocylindrium rufomaculans (Pk.) Pound & Clements, leaf spot. Iowa (3).

Septoria polygonina Thuem., leaf spot. N.Y. (5).

S. polygonorum Desm., leaf spot. Wis. (1,5), Vt. (4).

Ustilago anomala J.Kunze, floral smut. Northeastern States to Md., Mo., and Ill. (1,3,4,5).

YELLOWS—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif. (1).

Rheum

(1) *R. rhaponticum* L., garden rhubarb, pieplant, wineplant.
(2) *R. officinale* Baill.

Large perennial herb: (1) of central Asia, widely grown for edible leafstalks; other species, especially (2), are sometimes grown for ornament; (2) also furnishes officinal rhubarb.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Iowa, Mass., N.Y. (1).
Alternaria sp. (*?A. tenuis* Auct.) secondary leaf and stalk spot. Calif., Minn., Nebr., N.J., Pa. (1).
Armillaria mellea Vahl ex Fr., root rot. Calif., Tex. (1).
Ascochyta rhei Ell. & Ev., leaf spot. Eastern and Central States to Miss., Kans., and Wash. (1); N.J. (2).
Botrytis cinerea Pers. ex Fr., gray-mold rot. Occasional in the field, forcing culture, and markets; reported from Mich., Mo., Va., Wash. (1); Alaska (2).
Cercospora sp., leaf spot. Del., Md., Nebr.
C. rhapontici Tehon & Daniels—Ill. (1).
Cladosporium sp. (*?C. herbarum* Lk. ex Fr.), secondary leaf and stalk spot. Calif., Wash. (1).
Colletotrichum erumpens Sacc., anthracnose, stalk rot. Ill., Iowa, Mo., Okla., Pa., W. Va., Wis. (1).
Erwinia carotovora (L.R.Jones) Holland, soft rot. Occasional in markets (1).
E. rhapontici (Millard) Burkh., crown rot. Okla.
Fusarium sp., root rot (?secondary). N.C., Okla., Wash. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Macrophoma straminella (Bres.) Died., leaf and stalk spot. General (1).
Meloidogyne spp., root knot nematodes. Calif., Md., N.Y., Okla., ?Utah (1).
Peronospora rumicis Cda., downy mildew. Calif. (1).
Phyllosticta rhei Ell. & Ev.: See *Ascochyta rhei.*
P. straminella Bres.: See *Macrophoma straminella.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (1).
Phytophthora spp., root rot, crown rot. *P. cactorum* (Leb. & Cohn) Schroet. has been identified in Calif., Mo., Okla., and Pa. (1); *P. parasitica* Dastur identified in Ill., Kans., La., Md., Mo., N.Y., Tex., Va. (1).
Puccinia phragmitis (Schum.) Koern. (O,I), rust. Calif., Minn., Nebr. (1). II and III on *Phragmites communis* Trin.
Pythium spp., damping-off, root rot, crown rot. The following species reported:
P. anandrum Drechs.—Calif., Md. (1).
P. irregulare Buis.—Calif.
P. oligandrum Drechs.—Calif. (1).
P. splendens Braun—Calif.
P. ultimum Trow—Calif. (1).
Ramularia rhei Allesch., leaf and stalk spot. Calif. (1).
Rhizoctonia solani Kuehn, root rot. Calif., Conn., Ill., Minn., N.Y., Okla., Tex., Wash. (1).
Sclerotium rolfsii Sacc., southern blight. Fla., Miss., Tex., Va. (1).
Septoria rhaponticae Thuem., leaf spot. Iowa (1).

Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif., Oreg. (1).
Mosaic—suspected but unidentified virus. Calif., Ill., N.Y., Pa., Wash. (1).
Ring spot—suspected virus. Calif. (1). Susceptibility of rhubarb to cabbage black-ring strain of turnip mosaic virus (*Marmor brassicae* Holmes, Brassica virus 2 K.M.Sm.) has been shown experimentally.
Boron deficiency (crack-stem, ?black tip). Wash. (1).

Rumex

I. Subgenus *Acetosa and Acetosella*, Sorrel

(1) *Rumex acetosa* L., garden sorrel.
(2) *R. acetosella* L., sheep sorrel.
(3) *R. hastatulus* Baldw.

Perennials: (1) herb of Europe, sometimes grown for greens and as a salad plant, locally naturalized in the Northeastern States; (2) a weed, naturalized from Europe or native throughout the United States; (3) a native of the Atlantic seacoast and Central States; (2) and (3) are wildlife-food plants.

Cercospora acetosellae Ell.—Tex. (1,2); La., N.C., N.J. (2).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (2).
Gloeosporium rumicis Ell. & Ev., leaf spot. N.Y. (1), Tex. (1,2).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. ?Fla. (1,2).
Phyllosticta sp., leaf spot. N.Y. (1).
P. acetosellae A.L.Sm. & Ramsbottom, leaf spot. Wis. (2).
Puccinia acetosae (Schum.) Koern. (II,III), rust. Fla., N.Y., Pa. (1); Maine to Fla., Ala., and Ind., also Calif. and Oreg. (2); Fla., Mass., S.C. (3). O and I unknown.
Rhizoctonia solani Kuehn, root rot. Tex. (1,2).
Septoria pleosporoides Sacc., leaf spot. Tex. (1,2).
Synchytrium anomalum Schroet., on leaves. Iowa (1).
Ustilago rumicis (Berk.) Clint., inflorescence smut. S.C. (2); Ala., Fla. (3).
Yellows—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif. (1).

II. Subgenus *Lapathum*, Dock

(1) *Rumex crispus* L., yellow dock.
(2) *R. hymenosepalus* Torr., canaigre, wild-rhubarb.
(3) *R. obtusifolius* L., bitter, blunt-leaved, or red-veined, dock.
(4) *R. occidentalis* S. Wats.
(5) *R. patientia* L., spinach dock, herb-patience.
(6) *R. persicarioides* L.
(7) Other species.

Coarse perennial herbs, native or naturalized from Europe, occurring throughout almost the entire United States: (1) and (3) are important agricultural weeds; (2), of the southern Plains and Southwest, used similarly to rhubarb, the tuberous roots also furnishing tannin; (4) and (6) are wildlife-food plants; (5) sometimes grown for greens.

Aecidium minutulum Jacks. (O,I), rust. Tex. (7).
Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Iowa, Minn. (1).
Cercospora acetosellae Ell. var. *maculosa* Pk., leaf spot. N.Y. (1).
C. rumicis Ell. & Langl., leaf spot. Iowa (1); La., Tex. (3).

Colletotrichum erumpens Sacc., stem spot.
Cylindrosporium pulchrum Speg., leaf spot. La. (3); Mo., S. Dak. (7).
Diaporthe arctii (Lasch) Nits., on stems. Ga. (1).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. N.Y. (1,3).
Gloeosporium rumicis Ell. & Ev., leaf spot. Tex. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
H. schachtii A.Schmidt, root gall. Calif. (1).
Heterosporium caulicola Ell. & Ev., on dead stems. Colo. (4).
Meloidogyne spp., root knot nematodes. Calif. (2), ?Fla. (7).
Mycosphaerella rumicis (Desm.) Lindau, on leaves. Wash. (1,3,4); Oreg., Alaska (4); Calif., Alaska (7). SEE ALSO *Ovularia monosporia.*
M. stromatoidea Dearn., leaf spot. Alaska (3,7), Wash. (4).
Ovularia canaegricola P.Henn., leaf spot. N. Mex. (2); perhaps also in Calif., Minn., and Tex. on (2) as *Ramularia decipiens* Ell. & Ev.
O. monosporia (West.) Pound & Clements (*O. obliqua* (Cke.) Oud.), leaf and stem spot. General on (1) and (3); widespread (7). *O. rubella* (Bon.) Laibach is based on an earlier name but has not been widely recognized. Several authors have suggested a connection with *Mycosphaerella rumicis;* but this is denied by Laibach, who established its connection with a distinctly different species designated *Ovosphaerella lapathi* Laibach. *Ovosphaerella* is a segregate from *Mycosphaerella* which has an *Ovularia* conidial stage. It is close to *Ramosphaerella* which has a *Ramularia* conidial stage.
Ovosphaerella lapathi Laibach: SEE *Ovularia monosporia.*
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Wash. (4).
Phyllosticta circuligerens Tehon & Daniels, leaf spot. Ill. (7).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,7).
Physalospora obtusa (Schw.) Cke., on stems. Ga. (1,3).
Pratylenchus pratensis (De Man) Filip., root nematode. Utah (1).
Puccinia aristidae Tracy (O,I), rust. Ariz. (2).
P. phragmitis (Schum.) Koern. (O,I), rust. Nebr. (1); Iowa, Minn., N. Dak., Nebr., Okla., Wis. (7). II and III on *Phragmites communis* Trin.
P. ornata Arth. & Holw. (III), rust. N. Dak. (4); Maine, Minn., N.H., N.Y., Tex., Wis. (7).
P. punctiformis Diet. & Holw. (II,III), rust. Calif. (2,4,7); Kans., Tex., Wis. (7).
Ramularia spp., variously cited as *R. decipiens* Ell. & Ev., *R. macrospora* Auct., and *R. obovata* Fckl. Probably synonyms of *Ovularia monosporia,* q. v.
R. circumfusa Ell. & Ev.—Tex. (3).
R. decipiens Ell. & Ev.: SEE *Ovularia canaegricola.*
R. macrospora Auct.—S. Dak. (5).
R. occidentalis Ell. & Kell., leaf spot. Ill., Iowa, La., Kans., Miss., Nebr., N.H., Wis. (7).
R. pratensis Sacc.—Alaska (4); Wis. (6,7); Del., Md. (7).
Scptoria rumicicola Allesch. (*S. rumicis* Ell.), leaf spot. Minn. (1); Ill., Kans., N. Dak., N.Y., Wis. (7).
S. rumicis Trail—Ill., Kans., Nebr., Wyo. (7).
Sphaeropsis rumicicola Sacc., on dead stems. N.Y. (7).
S. sphaerelloides Ell. & Ev.—Ohio (7).
Uromyces rickerianus Arth. (I,II,III), rust. Idaho, Utah, Wyo. (on *R. paucifolius* Nutt.).
Urophlyctis major Schroet., on leaves. N. Dak., Wis. (7).
Ustilago parlatorei Fisch. v. Waldh., foliar smut. Ill., Mo., Nebr. (7).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1).
MOSAIC—suspected but unidentified virus. N.Y. (1,3); Ind. (7).

Tovara

T. virginiana (L.) Raf., Virginia knotweed, jumpseed.

Perennial herb of woodlands in the Eastern and Central States and southward; a wildlife-food plant.

Phlyctaena complanata (Berk. & Curt.) Sacc., on stems. N.Y., Pa.
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Mich.
Puccinia polygoni-amphibii Pers. var. *tovariae* Arth. (II,III).—Mass. to Fla., Tex., and Wis. O and I are unknown.
Rhabdospora polygoni Dearn. & House, on stems. N.Y.

POLYPODIACEAE

Adiantum, maidenhair fern

(1) *A. pedatum* L., American maidenhair fern.
(2) Other species.

Thin-leaved ferns native to the United States (1,2) or of tropical America or other warm regions (2): (1) grown in conservatories or sometimes as house plants; (2) grown in wild gardens.

Desmella superficialis (Speg.) Syd. (II,III), rust. P.R. (2). O and I unknown.
Meliola pteridicola F. L. Stevens, black mildew. C.Z., P.R. (2).
Micropeltis marattiae P.Henn., on leaves. P.R. (2).
Mycosphaerella sp. (*Sphaerella filicum* Desm., *S. pteridis* (Desm.) de N.), leaf spot. Iowa (1), Fla. (2).
Pezizella aspidiicola (Berk. & Br.) Rehm, on rhizomes. Mich. (1).
Phyllosticta adianticola E. Young, leaf spot. P.R. (2).
Sclerotium deciduum J. J. Davis (=*Ceratobasidium anceps* (Bres. & Syd.) Jacks.), on leafstalks and blades, ?rot. Wis. SEE ALSO *Rhizoctonia* sp. under *Pteridium.*

Asplenium, spleenwort

(1) *A. nidus* L., birdsnestfern.
(2) Other species.

Mostly tropical (1,2) and several native (2) ferns; (1) especially grown in conservatories.

Aphelenchoides olesistus (Ritz.-Bos) Steiner, leaf nematode. Conn., N.J., N.Y., Pa. (1); also reported as *A. fragariae* (Ritz.-Bos) Christie.
Cercospora sp., leaf spot. Fla. (2).
Pseudomonas asplenii (Ark & Tompkins) Savulescu, bacterial leaf spot. Calif.

Athyrium

(1) *A. filix-femina* (L.) Roth, ladyfern.
(2) *A. thelypteroides* (Michx.) Desv., silvery spleenwort.
(3) Other species.

Hardy ferns: (1) widely distributed in the United States in many forms and the source of numerous horticultural varieties; (2) and (3) in the Eastern and South Central States; some species in Far North.

Botrytis cinerea Pers. ex Fr., gray mold. Alaska (3).
Septoria asplenii Ell. & Ev., leaf spot. Mich. (3).
Uredinopsis copelandii Syd. (II,III), rust. Calif. (on *A. cyclosorum* Rupr., variety of (1), or closely related). O and I unknown.
U. longimucronata Faull (II,III).—Maine to Pa. and Wis. (on *A. angustum* (Willd.) Presl, var. of (1), or closely related). O and I on *Abies balsamea* (L.) Mill.
U. longimucronata f. *cyclosora* Faull (II,III).—Calif., Idaho, Mont., Oreg., Wash., Alaska (on *A. cyclosorum*). O and I on *Abies lasiocarpa* (Hook.) Nutt.
U. longimucronata var. *acrostichoides* Faull (II,III). N.H., N.Y., Wis. (2).

Blechnum

(1) *B. gibbum* (Labill.) Mett.
(2) *B. occidentale* L.

Tropical ferns suitable for greenhouse culture.

Aphelenchoides olesistus (Ritz.-Bos) Steiner, leaf nematode. (1).
Milesia australis Arth. f. *irregularis* Faull (II,III), rust. P.R. (2). O and I unknown.
Mycosphaerella filicum (Desm.) Schroet., on leaves. Fla.

Camptosorus

C. rhizophyllus (L.) Link, walkingfern, walkingleaf.

Small, hardy fern of the Eastern and Southern States, sometimes grown in rock gardens.

Cercospora camptosori J. J. Davis, leaf spot. Wis.

Cryptogramma

Cryptogramma spp., rockbrake, parsleyfern.

Small alpine or boreal ferns of northern and western United States, sometimes used in rock gardens.

Hyalopsora cheilanthis (Pk.) Arth. (II,III), rust. Iowa, Mich., Mont., Wis. O and I unknown.
Milesia darkeri Faull (II,III), rust. Calif., Oreg. O and I unknown.

Cyrtomium

C. falcatum Presl, house hollyfern.

Tropical fern often grown in conservatories and as a house plant.

Botrytis cinerea Pers. ex Fr., gray mold. Alaska.
Completoria complens Lohde, damping-off of prothallia. N.Y.

Cystopteris

(1) *C. bulbifera* (L.) Bernh., berry bladderfern.
(2) *C. fragilis* (L.) Bernh., brittlefern.

Small, delicate rockferns of moist cliffs and banks, chiefly of temperate and boreal localities and ranging throughout most of the United States; used in rock and wild gardens.

Hyalopsora polypodii (DC.) Magn. (II,III), rust. General in the Northern and Western States (2). O and I unknown.
Omphalia flavida (Cke.) Maubl. & Rangel, on leaves. P.R. (2).
Taphrina cystopteridis Mix—Ind., Kans., Wis. (2).
Uredinopsis ceratophora Faull (II,III), rust. Ind., N.Y., Wis. (1).
U. glabra Faull (II,III).—N. Mex. (2).

Dennstaedtia

D. punctilobula (Michx.) Moore, hay-scented fern, boulderfern.

Native fern of Eastern and Southeastern States, sometimes grown in wild gardens.

?Helotium scutula (Pers.) Karst.—Va.
Pezizella pteridina (Nyl.) Rehm, on leafstalks. Pa.

Dryopteris, woodfern, shieldfern

(1) *D. disjuncta* (Ledeb.) C. V. Mort. (*D. linnaeana* C. Chr.), oakfern.
(2) *D. filix-mas* (L.) Schoot, malefern.
(3) *D. marginalis* (L.) A. Gray, leather woodfern, marginal shieldfern.
(4) *D. phegopteris* (L.) C. Chr., narrow beechfern.
(5) *D. spinulosa* (Müll.) O. Kuntze, toothed woodfern.
(6) *D. thelypteris* (L.) A. Gray, marshfern, meadowfern, snuffboxfern.
(7) Other species.

Aphelenchoides olesistus (Ritz.-Bos) Steiner, leaf nematode.
Ceratobasidium anceps (Bres. & Syd.) Jacks.—N.H. (6). SEE ALSO *Rhizoctonia* sp. under *Pteridium*.
Cryptomycina pteridis (Rebent. ex Fr.) Hoehn., tar spot. Wis. (3).
Cylindrocladium pteridis Wolf, brown leaf spot. Fla. (7).
Desmella superficialis (Speg.) Syd. (II,III), rust. P.R. (7). O and I unknown.
Herpobasidium filicinum (Rostr.) Lind, frond spot, white mold, ?dieback. N.Y. (6).
Hyalopsora aspidiotus (Pk.) Magn. (II,III), rust. Maine to N.C., Wis., and Wash. (1). O and I on *Abies balsamea* (L.) Mill.
Leptostromella filicina (Berk. & Curt.) Sacc., on leafstalks. W. Va. (5).
Milesia dilatata Faull (II,III), rust. Oreg. (7). O and I unknown.
M. fructuosa Faull (II,III), Maine, Mass., N.H., N.Y., Vt. (5) and its varieties or closely related species. O and I on *Abies balsamea*, q. v.
M. marginalis Faull & W. R. Wats. (II,III).—Mass., N.H., N.Y. (3). O and I on *Abies balsamea*, q. v.
Taphrina californica Mix, leaf gall. Calif., Oreg. (7). On *D. arguta* (Kaulf.) Watt.
T. filicina Rostr. ex Johans.—N.Y., Pa. (5). According to Mix this is known only on (5) and its varieties from the vicinity of Ithaca, N.Y.
T. fusca Giesenh., leaf gall. N.H., Vt., W. Va. (5 and its varieties).
T. gracilis Mix—N.Y. (3).
T. lutescens Rostr.—Maine, Minn., N.Y., Wis. (6).
Uredinopsis atkinsonii Magn. (II,III), rust. Maine to Miss., Nebr., and N. Dak. (6, on var. *pubescens*

(Lawson) Prince). O and I on *Abies balsamea*, q. v.
U. phegopteris Arth. (II,III).—Maine, N.H., Wis. (1). O and I on *Abies balsamea*, q. v.

Nephrolepis

(1) *N. exaltata* (L.) Schott, swordfern, and var. *bostoniensis* Davenport, Boston fern.
(2) Other species.

Tropical ferns, widely grown for ornament, especially (1) in numerous horticultural varieties as a house plant.

Botrytis cinerea Pers. ex Fr., gray mold. Alaska (1).
Cercospora sp., leaf spot. Ind. (1).
Cylindrocladium pteridis Wolf, leaf spot. Fla. (1).
Glomerella nephrolepis Faris (*?G. cingulata* (Ston.) Spauld. & Schrenk), anthracnose, tip blight. N.Y., Ohio (1).
Milesia insularis Faull (II), rust. P.R. (2).
Phyllosticta sp., leaf spot. ?N.Y.
Rhizoctonia ?solani Kuehn, damping-off. Fla. (1).

Onoclea

O. sensibilis L., sensitivefern.

Coarse, hardy fern of the Eastern and Central States and southward, sometimes grown in wild gardens.

Ceratobasidium anceps (Bres. & Syd.) Jacks., on fronds, stem necrosis. N.Y., Wis. SEE ALSO *Rhizoctonia* sp. under *Pteridium*.
C. cornigerum (Bourd.) Rogers, saprophyte on leafstalks. ?N.Y. SEE ALSO *Rhizoctonia* sp. under *Pteridium*.
Cuscuta gronovii Willd., dodder. N.Y.
Taphrina filicina Rostr. ex Johans., leaf blister. According to Mix this species found only on *Dryopteris spinulosa* (Müll.) O. Kuntze and its varieties near Ithaca, N.Y.
T. hiratsukae Nishida—N.Y., Pa.
Uredinopsis mirabilis (Pk.) Magn. (II,III), rust. Maine to Va., Nebr., and Minn.; P.R. O and I on *Abies balsamea* (L.) Mill.

Pellaea, cliffbrake

Pellaea spp.

Mostly small rock ferns, usually of western United States, sometimes grown in conservatories.

Hyalopsora cheilanthis (Pk.) Arth. (II,III), rust. Calif., Tex. O and I unknown.

Polypodium, polypody

(1) *P. aureum* L., haresfootfern.
(2) *P. polypodioides* (L.) Watt, resurrectionfern.
(3) *P. virginianum* L., rock polypody.
(4) *P. vulgare* L., common polypody, wallfern.
(5) Other species.

Numerous widely distributed native ferns, often on walls or epiphytic; also tropical species grown in conservatories; (1,2,3) of eastern United States; (4) of western United States and frequent in cultivation.

Acrospermum maxoni Farl., leaf mold. C.Z. (5).
Alternaria polypodii Major (*?A. tenuis* Auct.), leaf spot (?secondary). ?N.Y. (4).
Aphelenchoides olesistus (Ritz.-Bos) Steiner, leaf nematode. (1,4,5).
Caliciopsis maxima (Berk. & Curt.) Hoehn., parasitic in sori. P.R. (5).
Cercospora phyllitidis Hume, leaf spot. Fla., P.R. (5).
Milesia laeviuscula (Diet. & Holw.) Faull (II,III), rust. Calif. (5); also f. *glycyrrhiza* Faull on *P. glycyrrhiza* D. C. Eaton in Oreg., Wash., and Alaska. O and I unknown.
M. polypodophila (Bell) Faull (II,III).—Conn., Maine, Mass., N.H., N.Y., Pa., Tenn., Vt. (3).
Phyllosticta sp., leaf spot. Va. (3).

Polystichum

(1) *P. acrostichoides* (Michx.) Schott, Christmas-fern, daggerfern.
(2) *P. adiantiforme* (Forst.) J. Sm., leather hollyfern.
(3) *P. munitum* (Kaulf.) Presl, giant hollyfern, Pacific Christmas-fern, western swordfern.

Hardy native (1,3) or tropical (2) ferns, commonly used for greenery in floriculture.

Aphelenchoides olesistus (Ritz.-Bos) Steiner, leaf nematode. Oreg. (3).
Cylindrocladium pteridis Wolf, leaf spot. Fla. (2).
Ditylenchus dipsaci (Kuehn) Filip., nematode leaf spot. Oreg. (3).
Milesia polystichi Wineland (II,III), rust. Idaho, Mont., Oreg., Wash. (3). O and I unknown.
M. vogesiaca (Syd.) Faull (II,III).—Oreg. (3).
Pezizella pteridina (Nyl.) Rehm, on leafstalks. Calif. (3).
Taphrina faulliana Mix, leaf blister. Oreg. (3).
T. polystichi Mix—Conn., Maine, Mass., Md., N.C., N.Y., Ohio, Pa., Tenn., Va., W. Va. (1).
Trabutiella filicina (Sacc. & Scalia) Th. & Syd., tar spot. On *P. lonchitis* (L.) Roth in Alaska.

Pteretis

P. pensylvanica (Willd.) Fern., American ostrichfern.

Hardy fern of the Northeastern and Great Lakes States, sometimes grown in wild gardens.

Ceratobasidium anceps (Bres. & Syd.) Jacks., on fronds, stem necrosis. Wis. SEE ALSO *Rhizoctonia* sp. under *Pteridium*.
Taphrina hiratsukae Nishida, leaf blister. Wis.
Uredinopsis struthiopteridis Störm. (II,III), rust. N.Y., Vt., Wis. O and I on *Abies balsamea* (L.) Mill.

Pteridium, bracken, brake

(1) *P. aquilinum* (L.) Kuhn var. *latiusculum* (Desv.) Underw.
(2) *P. aquilinum* var. *pseudocaudatum* (Clute) Heller
(3) *P. aquilinum* var. *pubescens* Underw.
(4) *P. caudatum* (L.) Maxon

Hardy ferns of cosmopolitan distribution, dominant plant in many seacoast and upland regions: (1) in the Northeastern States to North Carolina and Tennessee; (2) in the Southeastern States; (3) in the Northwest, California and Texas; (4) in Florida and the West Indies.

Ascochyta necans (Ell. & Ev.) J. J. Davis: See *Cryptomycina pteridis.*

Catacauma flabellum (Schw.) Th. & Syd., black mildew, tar spot (typically on upper surface and following veins). Md., N.J., Pa., Tenn., W. Va., Wis. (1); Ga., S.C. (2).

Ceratobasidium cornigerum (Bourd.) Rogers: See *Rhizoctonia* sp.

Cryptomycina pteridis (Rebent. ex Fr.) Hoehn., tar spot, or when systemic, causing leaf-roll disease (typically on lower surface and interveinal). Maine to N.C., Iowa, and Wis. (1); Ala., Ga., Miss. (2); Calif., Idaho, Mont., Oreg., Wash., Alaska (3). Usually reported under the numerous conidial names, such as *Gloeosporium leptospermum* Pk., *G. necans* Ell. & Ev., *G. obtegens* Syd., *G. pteridis* Harkn.; also *Ascochyta necans* (Ell. & Ev.) J. J. Davis *Cylindrosporium aquilinum* (Pass.) Gilman & Archer, and *Marssonina necans* (Ell. & Ev.) Magn.

Cylindrosporium aquilinum (Pass.) Gilman & Archer: See *Cryptomycina pteridis.*

?Dothidella osmundae (Pk. & Clint.) Sacc., on petioles. ?U.S. (1), [on (1) in Nova Scotia, Canada].

Gloeosporium spp.: See *Cryptomycina pteridis.*

Leptostroma filicinum Fr.: See *Rhopographus filicinus.*

L. litiginosum Desm., on leafstalks. N.Y. (1); Calif., Wash. (3). Conidial stage of *Microthyrium litiginosum* Sacc.

L. pteridis Ehr. (*?Thyriostroma pteridis* Died.), on leaves. Maine (1).

Leptostromella filicina (Berk. & Curt.) Sacc. (*L. pteridina* Sacc. & Roum.), on leafstalks. Mich.

Marssonina necans (Ell. & Ev.) Magn.: See *Cryptomycina pteridis.*

Mycosphaerella spp., on old leaves or stalks. Species reported include: *M. indistincta* (Pk.) Lindau and *M. pteridicola* Dearn. & House in N.Y. (1); *Sphaerella pteridis* (Desm.) de N. in Mass. (1); Calif. (3).

Phyllosticta pteridis Halst., leaf spot. Maine, N.J.

Rhizoctonia sp., scurf, ?canker, on leafstalks. Oreg. (3). Probably the bracken disease fungus described in Scotland as *Corticium anceps* Bres. & Syd. and transferred to *Ceratobasidium anceps* (Bres. & Syd.) Jacks. by H. S. Jackson; may also include *Sclerotium deciduum* J. J. Davis as reported by J. J. Davis in Wis. A second species, *Ceratobasidium cornigerum* (Bourd.) Rogers, is reported on various fern hosts, including *Pteridium*, in Ontario, Canada, by Jackson. It is considered wholly saprophytic in contrast to *C. anceps* which is parasitic.

Rhopographus filicinus (Fr.) Nits. ex Fckl., on dead leafstalks. Maine, N.J., N.Y. (1); Calif. (3); probably general.

Sclerotium deciduum J. J. Davis: See *Rhizoctonia* sp.

Septoria aquilina Pass. and *S. pteridis* Pk.: See *Cryptomycina pteridis.*

Sphaerella pteridis (Desm.) de N.: See *Mycosphaerella* spp.

Uleodothis pteridis F. L. Stevens, leaf spot. P.R. (3).

Uredinopsis aspera Faull (II,III), rust. Calif., T.H. (3).

U. macrosperma (Cke.) Magn. (II,III), rust. Ala., Fla., Ga., Miss. (2); Calif., Idaho, Mont., N. Mex., Oreg., Wash. (3); Fla., Ga., C.Z. (4).

U. virginiana Faull (II,III). N.Y. to N.C. and Tenn. (1); Ga. to Tex. (2).

Pteris, brake

(1) *P. cretica* L.
(2) *P. serrulata* L. f.
(3) Other species.

Tropical ferns, usually grown in conservatories but also in the open, especially (2), in the Gulf States.

Aphelenchoides olesistus (Ritz.-Bos) Steiner, nematode leaf spot. Conn., N.J., N.Y. (1,2,3).

Completoria complens Lohde, damping-off of prothallia. N.Y. (1,3).

Phyllosticta pteridis Halst., tip blight. Miss., N.J. (1).

Pythium intermedium d By., damping-off. N.Y. (1,3).

Trichothecium roseum Lk., damping-off of prothallia. Ind. (3).

Woodsia

(1) *W. glabella* R. Br.
(2) *W. scopulina* D. C. Eaton, Rocky Mountain Woodsia.

Small rock-ferns of the Northern Border States, sometimes grown in rock gardens.

Hyalopsora polypodii (DC.) Magn. (II,III), rust. Mich. (1), Idaho (2). O and I unknown.

Woodwardia, chainfern

(1) *W. areolata* (L.) Moore
(2) *W. virginica* (L.) J. E. Sm.

Coarse ferns of swamps or ponds in the Eastern and Gulf States, sometimes grown in wild gardens.

Uredinopsis arthurii Faull (II,III), rust. Vt. to Ala., Ind., and Mich. (2). O and I unknown.

U. arthurii var. *maculata* Faull (II,III). Maine to Ala. O and I unknown.

PONTEDERIACEAE

Heteranthera, mud-plantain

H. dubia (Jacq.) MacM., water-stargrass.

Perennial herb of fresh-water ponds and streams, widely distributed in the United States; a wildlife-food plant.

Membranosorus heterantherae Ostenfeld & Petersen, root hypertrophy. N.Y., Vt.

Pontederia

P. cordata L., pickerelweed.

Aquatic herb of shallow ponds and streams in the Central and Eastern States and southward; a wildlife-food plant.

Cercospora pontederiae Ell. & Dearn., leaf spot. Tex., Wis.

Mycosphaerella pontederiae (Pk.) House, leaf spot. N.Y., Tex., Va.

Uromyces pontederiae Gerard (II,III), rust. Del., Fla., Ga., Mo., N.C., N.Y., Pa., Tex., Va. O and I unknown.

PORTULACACEAE

Claytonia, springbeauty

(1) *C. caroliniana* Michx.
(2) *C. megarrhiza* (A. Gray) Parry
(3) *C. virginica* L.
(4) Other species.

Mostly small, spring-blooming, woodland perennial herbs: (1) and (3) of the Eastern and Central States; (2) of the Far West; this genus used in rock and wild gardens.

Peronospora claytoniae Farl., downy mildew. Iowa, Md., Tex. (3); Calif., Wash. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physoderma claytoniana Greene, leaf gall. Mich., Wis. (2).
Puccinia agnita Arth. (O,III), rust. Colo. (2). Correlated with the following:
P. mariae-wilsoni G. W. Clint. (O,I,III), rust. N.H., N.Y., Vt. (1); Colo. (2); N.H. to Va., Mo., and Wis. (3); Utah, Wash., Alaska (4).
Ramularia claytoniae W. B. Cke., leaf spot. Calif. (4).
Uromyces claytoniae Cke. & Pk. (O,I,III), rust. N.Y. (1).

Lewisia

(1) *L. rediviva* Pursh, bitterroot.
(2) Other species.

Perennial herbs of the northern Rocky Mountain and Pacific States; sometimes grown in rock gardens.

Uromyces unitus Pk. (I,III), rust. Calif., Mont. (1); Calif., Wash. (2).

Montia

M. linearis (Dougl.) Greene, Indian-lettuce.

Small annual herb of wet meadows in the Pacific Northwest, useful to wildlife.

Ustilago claytoniae Shear, seed smut. Wash.

Portulaca, purslane

(1) *P. grandiflora* Hook, rose-moss.
(2) *P. oleracea* L., common purslane, "pusley."

Annual herbs: (1) of Brazil, widely grown for ornament; (2) a cosmopolitan herbaceous weed, but one variety (var. *sativa* DC.) is sometimes grown for greens.

Albugo portulacae (DC.) O.Kuntze, white-rust. Maine to Ga., Tex., and Mont. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
H. schachtii A.Schmidt, on roots. Colo., Utah (2).
Meloidogyne sp., root knot nematodes. Ala.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Rhizoctonia solani Kuehn, damping-off. Ill., Tex. (1).
?Vermicularia oblongispora Ell. & Ev.—Tex. (2).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1).

Spraguea

Spraguea spp., especially *S. multiceps* Howell and *S. umbellata* Torr., pussypaws.

Perennial herbs of California and the Northwest, sometimes grown in rock gardens.

Uromyces spragueae Harkn. (I,III), rust. Calif., Oreg., Wyo.

POTAMOGETONACEAE

Potamogeton

Potamogeton spp., pondweed.

Numerous aquatic herbs of fresh-water lakes and streams throughout temperate North America, a few in brackish water; important food plants for wildlife.

Doassansia martianoffiana (Theum.) Schroet., leaf smut. Frequent on *P. natans* L. and other species from Mass. to N.C., Ill., and Wis.; also Wash.
D. occulta (Hoffm.) Cornu, seed smut. On *P. epihydrus* Raf. in Conn., Md., N.Y.; on other species in Calif., Ill., Kans.
D. occulta var. *farlowii* (Cornu) Setch. — Vt. and northward.
Lagenidium muenscheri Cutter, root hypertrophy. On *P. spirillus* Tuckerm. in N.Y.
Ramularia aquatilis Pk., leaf spot. On *P. americanus* Cham. & Schlecht. in Kans. and N.Y.
Rhizoctonia solani Kuehn, stem rot. On *P. pectinatus* L. and *P. perfoliatus* L. in salt-water bays of N.C. and Va.

PRIMULACEAE

Anagallis

A. arvensis L., scarlet pimpernel, poormans-weatherglass.

Annual herb of Europe, widely naturalized in America; a weed in cultivated ground but useful to wildlife.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H.
Septoria anagallidis Ell. & Halst., leaf spot. N.J., Tex.
YELLOWS—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif.

Androsace, rockjasmine

(1) *A. occidentalis* Pursh
(2) Other species.

Small, mostly perennial, herbs of the North Central and Western States, or introduced from Europe; some are grown in rock gardens.

Mycosphaerella primulae (Auers. & Heufl.) Schroet., leaf spot. N. Mex. (2).
Peronospora candida Fckl., downy mildew. Kans. (1).
Puccinia volkartiana E.Fisch. (III), rust. Alaska.

Cyclamen

(1) *C. persicum* Mill. (*C. indicum* Auct.), cyclamen (of florists).
(2) Other species.

Tuberous rooted or cormous herbs of the Mediterranean region: (1) widely grown as a florists' plant; others in outdoor gardens.

Aphelenchoides fragariae (Ritz.-Bos) Christie, leaf nematode.
Botrytis cinerea Pers. ex Fr., gray-mold, bud and leaf rot. Cosmopolitan. Petal spot, Calif.
Cladosporium cyclaminis Massey & Tilford, stunt (spot necrosis of tubers and leaves). Calif., Ill., N.J., Ohio, Pa. SEE ALSO *Ramularia cyclaminicola* Trel.
Colletotrichum cyclamenae Halst.: SEE *Glomerella cingulata.*
Erwinia carotovora (L.R.Jones) Holland, tuber rot. Ohio, ?N.J., N.Y.
Fusarium sp. (*?F. oxysporum* Schlecht.), wilt. N.J.
Gloeosporium cyclaminis Sibilia: SEE *Glomerella cingulata.*
Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf and bud blight. Ind., Mass., Mo., N.J., Ohio, Pa., Tex., Va. Reported variously as: *Colletotrichum, Gloeosporium, Glomerella rufomaculans* Spauld. & Schrenk var. *cyclaminis* Patterson & Charles but is probably this.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Cosmopolitan.
Phyllosticta sp., leaf spot. N.J.
P. cyclaminicola Trel.—Ill., Ohio, Tex.
P. cyclaminis Brun.—Va. This name has priority and may include the preceding and perhaps, also, *Phoma cyclamenae* Halst.
Pratylenchus pratensis (De Man) Filip., meadow nematode, in roots. Va.
Ramularia cyclaminicola Trel., leaf spot, white mold. Calif., Ill., Minn., Ohio.
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Conn.

Dodecatheon, shootingstar

(1) *D. meadia* L., American cowslip.
(2) *D. pauciflorum* (Durand) Greene
(3) Other species.

Small, perennial, scapose herbs, mostly of alpine habitats in the Western States; a few, including (1), in the Central States and eastward. Several are of ornamental value, especially (1), and are grown in rock and wild gardens.

Heterosporium sp., leaf spot. Alaska (3).
Phyllosticta dodecathei Trel., leaf spot. Tex., Wis. (1).
Puccinia melanconioides Ell. & Harkn. (O,I,III), rust. Calif., Oreg. (3).
P. ortonii Jacks. (O,I,II,III). Calif., Oreg., S. Dak., Utah, Wash., Alaska (3).
P. solheimii Cumm. (III).—Wyo. (2).
Uromyces acuminatus Arth. var. *steironematis* (Arth.) J.J.Davis (O,I), rust. Nebr. (1), N. Dak. (3). II and III on *Spartina* spp.

Glaux

G. maritima L., sea-milkwort.

Perennial herb of salt marshes on the North Atlantic coast; also on saline soil in the West; useful to wildlife.

Ascochyta sp., leaf spot. Alaska.
Puccinia distichlidis Ell. & Ev. (O,I), rust. Mont., Wyo. II and III on *Spartina* spp.

Lysimachia, loosestrife

(1) *L. nummularia* L., moneywort.
(2) *L. terrestris* (L.) B.S.P., swamp loosestrife.
(3) *L. thyrsiflora* L., water loosestrife, tufted loosestrife.
(4) *L. vulgaris* L., garden loosestrife.
(5) Other species.

Perennial herbs of moist ground or swamps, except (4): Naturalized from Europe (1,4) or native (2,3), mostly in the Eastern and Central States; some are grown for ornament or are useful to wildlife.

Ceratobasidium anceps (Bres. & Syd.) Jacks., stem and leaf necrosis. On *L. ciliata* L. in Wis. Reported as *Sclerotium decidum* J.J.Davis.
Cercospora lysimachiae Ell. & Halst., leaf spot. N.J. (2).
Cladosporium lysimachiae Guba, leaf spot. Mass. (4).
Coleosporium campanulae (Pers.) Lév. (II,III), rust. Tenn. (5). O and I on *Pinus resinosa* Ait.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Tex. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pleosphaerulina hyalina Berl., on leaves. Va. (1).
Puccinia limosae Magn. (O,I), rust. ?Tex. (1); Mass. to N.C. and Mich. (2); Ill., Mass., Nebr., N.Y., Wis. (3); also on other species in this range.
Ramularia lysimachiae Thuem., leaf spot. Tex. (1), Wis. (2,3).
Sclerotium deciduum J.J.Davis: SEE *Ceratobasidium anceps.*
S. delphinii Welch, stem rot. Kans. (1).
Septoria conspicua Ell. & G.Martin, leaf spot. Tex. (1); Iowa, N.Y., Vt. (5).
Synchytrium aureum Schroet., leaf gall. Wis. (2).

Primula, primrose, cowslip

(1) *P. elatior* Hill, oxslip.
(2) *P. malacoides* Franch., fairy primrose.
(3) *P. obconica* Hance
(4) *P. polyantha* Mill.
(5) *P. sinensis* Lindl., Chinese primrose.
(6) *P. vulgaris* Huds.
(7) Native species.
(8) Other species.

Low, mostly boreal or alpine, perennial herbs: (1,4,6,8) mostly of Europe and western Asia, grown in the open; (2,3,5) of China, grown under glass as flowering pot plants; (1,4,6,8) are garden primulas; (2,3,5) florists' primulas; (7) includes native species of western United States, sometimes grown in rock gardens.

Alternaria sp., stem rot. Conn. (8).
Ascochyta primulae Trail, leaf spot. ?Wis. (1).
Asteroma garrettianum Syd., black leaf spot. Colo., Utah (7).

Botrytis cinerea Pers. ex Fr., gray-mold blight. Frequent in greenhouse and indoor culture (3,5); occasional in the open (1,4,8).
Cercosporella primulae Allesch., leaf spot. Wash. (1).
Colletotrichum primulae Halst., leaf spot. Fla. (?4).
Ditylenchus dipsaci (Kuehn) Filip., leaf and stem nematode. Md., Pa. (3,5).
Erysiphe polygoni DC., powdery mildew. N.J., Va. (4); Conn. (6).
Hendersonia foliorum Fckl., on leaves. N. Mex. (7).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Occasional in greenhouse culture (3,5).
Mycosphaerella sp., leaf spot. Ariz. (7).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Pseudomonas primulae (Ark. & Gardner) Starr & Burkh., bacterial leaf spot. Calif. (4,8).
Puccinia aristidae Tracy (O,I), rust. Maine.
Pythium irregulare Buism., root rot. Calif. (3).
Ramularia primulae Thuem., leaf spot. Del. (1); Conn., N.Y. (4); Calif. (5).
Rhizoctonia solani Kuehn, root rot. Ill. (2); Fla., Tex.
Uromyces apiosporus Hazsl. (III), rust. Calif., Nev. (7).
Mosaic—virus. In part, *Marmor primulae* Holmes, identified in Calif. on (3), experimentally transmitted to (2) and (5); in part unidentified, as reported in Ind., Mich., ? N.J., Pa. (3). Cucumber mosaic virus (*M. cucumeris* Holmes, Cucumis virus 1 K.M.Sm.) causes a similar but not identical disease.
Spotted wilt — virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (3,4).
Tobacco necrosis — virus (*Marmor lethale* Holmes, Nicotiana virus 11 K.M.Sm.). Pa. (2,3). In foliage, but not the cause of mottling or chlorosis; local lesions in (2).
Yellows — virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif. (4).
Chlorosis — physiological, attributed to excessive soil acidity or to mineral deficiency as iron and magnesium. Occasional in greenhouse culture (3).

Steironema

(1) *S. ciliatum* (L.) Raf., fringed loosestrife.
(2) Other species.

Perennial herb of wide distribution in the United States, sometimes grown in wild gardens and of use to wildlife.

Cylindrosporium steironematis Atk., leaf spot. N.Y. (1).
Mycosphaerella sp. (*Sphaerella ciliata* Ell. & Ev.), leaf spot. N.Y. (1).
Pezizella oenotherae (Cke. & Ell.) Sacc., on stems and leaves. Va., Wis. (1).
Phyllosticta decidua Ell. & Kell.—Tex. (1).
P. lysimachiae Allesch., leaf spot. N.Y. (1).
P. steironematis Dearn. & House—N.Y., Pa., Wis. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia dayi G.W.Clint. (III), rust. N.Y. to W. Va., Ill., and Mont. (1); Mich., Wis. (2).
P. distichlidis Ell. & Ev. (O,I). Colo., N. Dak., Tex. (1). II and III on *Spartina* spp.
Ramularia lysimachiae Thuem., leaf spot. N.C. (1); Wis. (1,2).
Septoria conspicua Ell. & G.Martin, leaf spot. Maine to Miss., Colo., and Wis. (1); Ill., Iowa, N. Dak., Wis. (2).
S. lysimachiae West.—Mich., N.Y. (1).
Uromyces acuminatus Arth. var. *steironematis* (Arth.) J.J.Davis (O,I), rust. Conn. to Colo. and S. Dak. (1); N. Dak. (2).

Trientalis

(1) *T. borealis* Raf., starflower.
(2) Other species.

Perennial herb of the Northeastern and Central States, sometimes grown in wild gardens and useful to wildlife.

Ceratobasidium anceps (Bres. & Syd.) Jacks., leaf rot. Wis.
Cylindrocarpon magnusianum (Sacc.) Wr., leaf spot. Mass., Mich., N.Y., Wis. (1); Calif. (2).
Puccinia karelica Tranz. (O,I), rust. N.Y., Wis. (1); Alaska (2). II and III on *Carex* spp.
Sclerotium deciduum J.J.Davis: See *Ceratobasidium anceps.*
Septoria increscens Pk., leaf spot. Maine, Mich., N.Y., Vt., Wis. (1); Calif. (2).
Synchytrium aureum Schroet., leaf gall. Pa. (1).
Tuburcinia trientalis Berk. & Br., leaf and stem smut. Oreg., Wash., Alaska (2).

PROTEACEAE

Grevillea

Grevillea spp., especially *G. robusta* A. Cunn., silk-oak.

Trees or shrubs of Australia, grown in the Far South as shade trees, also under glass for ornament.

Asterina globifera Ell. & Ev., black leaf spot. T.H.
Botryosphaeria ribis Gross. & Dug., on branches. T.H.
Cephaleuros virescens Kunze, algal spot. Fla.
Diplodia sp. (*?Physalospora rhodina* (Berk. & Curt.) Cke.), dieback, gum disease. Fla.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz.

Macadamia

M. ternifolia F. Muell., Queensland-nut.

Australian nut-bearing tree, cultivated in southern California, southern Florida, and Hawaii.

Gloeosporium sp., flower blight. T.H.

PUNICACEAE

Punica

P. granatum L., pomegranate

Partly deciduous shrub or small tree of the Mediterranean region, cultivated for ornament and for its edible fruit, zone 7. A dwarf variety, *nana* (L.) Pers., is hardy in zone 6.

Alternaria sp., fruit rot. Calif.
Aspergillus niger van Tiegh. (*Sterigmatocystis castanea* Patterson), internal rot. Ariz., Calif., Tex.

Botrytis cinerea Pers. ex Fr., gray mold rot. Cosmopolitan.
Cercospora lythracearum Heald & Wolf: See *Mycosphaerella lythracearum.*
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Colletotrichum sp. (*C. ?gloeosporioides* Penz.), anthracnose, fruit spot. Fla., P.R.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Miss.
Mycosphaerella lythracearum Wolf (*Cercospora lythracearum* Heald & Wolf), leaf blotch, fruit spot. Fla. to Miss., Tex.
Nematospora coryli Peg., dry rot of fruit. Calif.
Pellicularia koleroga Cke., thread blight. Fla., Okla.
Penicillium expansum Lk. ex Thom, blue mold rot. Cosmopolitan.
Phomopsis sp., on twigs. Okla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Sphaceloma sp.—La.

PYROLACEAE [11]

Chimaphila, wintergreen, waxflower

(1) *C. maculata* (L.) Pursh, spotted wintergreen.
(2) *C. umbellata* (L.) Bart.

Evergreen woodland herbs: (1) in the Eastern and North Central States; (2), in several geographic varieties, nearly throughout the United States; sometimes grown in wild gardens.

Mycosphaerella chimaphilina (Sacc.) House, leaf spot. N.Y., Pa., Oreg., Wash. (2). May not be distinct from *Sphaerella chimaphilae* Ell. & Ev.; also published as *Mycosphaerella chimaphilae* (Ell. & Ev.) Hoehn. Early report in Del. on (2).
Pellicularia filamentosa (Pat.) Rogers, on leaves. Mass. (1).
Pucciniastrum pyrolae (Pers.) Schroet. (II,III), rust. N.Y. to N.C., Tenn., and Wis. (1); N.Y., Pa., Wis., also Calif, Mont., Oreg., Wash. (2).
Septoria chimaphilae Ell. & Ev., leaf spot. Del. (1).
Stigmatea pyrolae (Fr.) Schroet., on leaves. N.Y. (2).

Moneses

M. uniflora (L.) Gray, woodnymph.

Evergreen herb of woodlands in northern United States, sometimes grown in wild gardens.

Chrysomyxa pyrolae (DC.) Rostr. (II,III), rust. Colo., Maine, Mich., Mont., N.Mex., Wash., Wyo., Alaska. O and I on *Picea* spp.

Pyrola,[12] shinleaf, pyrola, wintergreen

(1) *P. asarifolia* Michx., pink pyrola, or wintergreen.
(2) *P. elliptica* Nutt., shinleaf, wild-lily-of-the-valley.
(3) *P. rotundifolia* L. var. *americana* (Sweet) Fern.
(4) *P. secunda* L., one-sided pyrola, or wintergreen.
(5) Other species.

Evergreen herbs of dry woodlands or bogs in northern United States and at high elevations southward; sometimes grown in wild gardens.

Botrytis cinerea Pers. ex Fr.., leaf blight. Md. (3).
Chrysomxa pyrolae (DC.) Rostr. (II,III), rust. General from Maine to Md., Iowa, and Minn., and in the West from Mont. to N. Mex., Calif., and Alaska (1,2,3,4,5). O and I on *Picea* spp.
Mycosphaerella chimaphilae (Ell. & Ev.) Hoehn., leaf spot. Mich. (4).
Ovularia pyrolae Trel., leaf spot. Wis. (2,3).
Phyllosticta pyrolae Ell. & Ev., leaf spot. Wis. (2); Del., Mont. (3).
Pucciniastrum pyrolae (Pers.) Schroet. (II,III), rust. General in the West from N.Dak. to Colo., Calif., and Alaska, also Conn. to Wis. and Iowa (1,2,3,5).
Ramularia pyrolae Trel., leaf spot. Wis. (3).
Septoria pyrolae Ell. & G.Martin, leaf spot. Mich. (4).
Sphaerella isariphora (Desm.) de N.—Colo. (4).

RANUNCULACEAE

Aconitum, aconite, monkshood, wolfsbane

(1) *A. carmichaelii* Debeaux (*A. fischeri* Forbes & Hemsl.), azure monkshood.
(2) *A. napellus* L., aconite.
(3) Other species.

Hardy perennial herbs, introduced and native, grown for ornament or, chiefly in Europe, for the alkaloid aconite.

Erysiphe polygoni DC., powdery mildew. N.Y., W.Va. (1); Tex. (3).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. N.Y., Vt. (?2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Plasmopara pygmaea (Ung.) Schroet., downy mildew. Alaska (3).
Pseudomonas delphinii (E.F.Sm) Stapp, bacterial leaf spot. Maine (3).
Puccinia rubigo-vera (DC.) Wint. (O,I), rust. Colo., Alaska (3). The forms on *Aconitum* have been identified as f. sp. *aconiti-rubrae* (Lüdi) Mains and f. sp. *actaeae-elymi* (Mayor) Mains, with II and III on *Elymus* and *Festuca.*
Rhizoctonia solani Kuehn, root rot. Conn., N.J. (2).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Colo. (1).
Sclerotium delphinii Welch (=*S. rolfsii* Sacc.), stem rot. Conn., Del., Md., Minn., N.J., N.Y. (2).
Urocystis carcinodes (Berk. & Curt.) Fisch. v. Waldh., leaf and stem smut. Utah (3).
U. sorosporioides Koern., leaf and stem smut. Utah (3).
Uromyces lycoctoni (Kalchbr.) Trotter (O,I,II,III), rust. Calif., Colo., Tex., Utah, Wyo. (3).
Verticillium albo-atrum Reinke & Berth., wilt. Mass., N.J., N.Y. (1); Mass., ?Ohio (2).

Mosaic—unidentified virus. N.Y. (2).

[11] Sometimes placed as a tribe in Ericaceae.

[12] See also Gaultheria (Ericaceae).

Actaea, baneberry, necklaceweed, cohosh

(1) *A. alba* (L.) Mill. (*A. pachypoda* Ell.), white baneberry, white cohosh, dolls-eyes.
(2) *A. rubra* (Ait.) Willd., red baneberry, snakeberry.
(3) Other species.

Erect perennial herbs of woodlands, mostly in the Northeastern and Central States (1,2) or in the Northwest (3); grown for ornamental berries.

Actinonema actaeae Allesch.: See *Ascochyta actaeae*

Ascochyta actaeae (Bres.) J.J.Davis, leaf spot. Wis. (2). In Europe also known as *Actinonema actaeae* Allesch. and *Marssonina actaeae* (Bres.) Magn.

Marssonina actaeae (Bres.) Magn. See *Ascochyta actaeae*.

Puccinia rubigo-vera (DC.) Wint. (O,I), rust. N.Y. to Va., Ill., and Minn. (1,2); Wash., Alaska (3). The forms *actaeae-agropyri* (E. Fisch.) Mains and *actaeae-elymi* (Mayor) Mains have been distinguished, with II and III on *Agropyron* and *Elymus*.

Ramularia actaeae Ell. & Hollw., leaf spot. Iowa, Vt. (1); Colo., N.Mex. (2); Wis. (2,3).

Urocystis carcinodes (Berk. & Curt.) Fisch. v. Waldh., leaf and stem smut. Pa., W.Va. (1); Idaho (2); Utah (2,3).

Anemone, anemone, windflower

I. Cultivated Species

(1) *Anemone coronaria* L., poppy anemone.
(2) *A. japonica* Sieb. & Zucc., Japanese anemone.
(3) Other species.

Exotic perennial herbs, grown under glass for winter bloom (1) or in the open in borders and rock gardens.

Aphelenchoides olesistus (Ritz.-Bos) Steiner, leaf nematode. Conn., ?N.Y. (2).

A. ritzema-bosi (Schwartz) Steiner—Calif. (2).

Aphelenchus agricola De Man, in roots. Calif. (2).

Botrytis cinerea Pers. ex Fr., collar rot. N.J., Pa. (1,3).

Gloeosporium sp., leaf spot. N.Y. (1).

Phoma regina Fairm., on stems. N.Y. (2).

Phyllosticta anemones Brun., leaf spot. Md. (2).

Sclerotium rolfsii Sacc. (*S. delphinii* Welch), southern blight. Calif. (1); Md., Mass. (3).

Tranzschelia cohaesa (Long) Arth. (O,I,II,III), rust. Tex. (2).

T. discolor (Fckl.) Tranz. & Litv. (O,I), rust. Calif., Oreg. (1). II and III on cultivated *Prunus* spp.

Mosaic—unidentified virus. Calif. (2).

Yellows—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif. (1).

II. Native Species

(1) *Anemone canadensis* L., meadow anemone.
(2) *A. caroliniana* Walt.
(3) *A. cylindrica* A. Gray, candle anemone, thimbleweed.
(4) *A. patens* L., American pasque-flower, prairie-smoke, hartshornplant; including *A. ludoviciana* Nutt.
(5) *A. quinquefolia* L., wood anemone.
(6) *A. virginiana* L., thimbleweed.
(7) Other species.

Cercospora pulsatillae Clements, leaf spot. Colo. (4).

Cercosporella filiformis J.J.Davis, leaf spot. Wis. (4).

Didymaria didyma (Unger) Pound, leaf spot. Iowa, Mich., Wis. (1,3,6).

Entyloma ranunculi (Bon.) Schroet., white smut. Wis. (5).

Erysiphe polygoni DC., powdery mildew. Ill., Iowa., N.Dak., N.J., Wis. (1); Iowa, Mich., Minn. (6); Ill., Ind. (7).

Phleospora anemones Ell. & Kell., leaf speck. Iowa (3).

Phoma anemone Kauff., on stems. Fla. (6).

Phyllosticta anemonicola Sacc. & Syd., leaf spot. Ill., Mich., Wis. (1); Ill., Nebr., Wis. (3); Md., Mich., Va. (7).

P. ellisiana Lambotte & Fautr.—Vt. (6).

Plasmopara pygmaea (Ung.) Schroet., downy mildew. N.Y. to Ill. and N.Dak. (1); Iowa (2); Mass. to Ill. and Wis. (5); Ill., N.Y., Wis. (6); Mont., S.Dak. (7).

Puccinia anemones-virginianae Schw. (III), rust. Iowa, Mich., N.Y. (1); Conn. to Nebr. and N.Dak. (3), Maine to Miss., Okla., and N.Dak. (6). Correlated with *P. magnusiana*, q. v.

P. gigantispora Bub. (O,I,III), rust. Colo., Ill., N.Dak., Wis. (3); Colo., Idaho., Mont., Wyo., Alaska (7).

P. magnusiana Koern. (O,I), rust. N.Y. to Kans. and N.Dak. (1). II and III on *Phragmites communis* Trin.

P. pusatillae Kalchbr. (III), rust. Colo., Iowa, N.Dak., S.Dak. (4); Alaska (4,7); Oreg. (7). Correlated with *P. rubigo-vera*, q. v.

P. retecta Syd. (III), rust. Colo., Alaska (7).

P. rubigo-vera (DC.) Wint. (O,I), rust. Frequent (3); occasional (1,2,5,6,7) from N.Y. to Tex., Colo., and Mont. The vars. *agropyri* (Eriks.) Arth. and *agropyrina* (Eriks.) Arth. and the f. spp. *canadensis*, *dakotensis*, and *anemonicola* of Mains have been distinguished, all with II and III on *Agropyron*, *Elymus*, *Hordeum*, or *Hystrix*.

P. vesiculosa Schlecht. (III), rust. Alaska (7).

Pyrenophora ampla Syd., on leaves and stems. Utah (7).

Ramularia ranunculi Pk., leaf spot. N.Y. (1), Wis. (3).

Septoria anemones Desm., leaf spot. Ill., Iowa (1); Miss., Tex. (2); Wis. (3,5); Ill., Iowa, Miss., Mo., Vt., Wis. (6).

S. cylindrica Ell. & Ev.—Mont. (3), Va. (6).

S. punicea J.J.Davis (*Phleospora anemones* Ell. & Kell.)—Nebr. (3); Mass., Mich., Miss., Wis. (6); Kans. (7).

Stagonospora pulsatillae Vest., on stems. Alaska (7).

Synchytrium anemones (DC. ex Fr.) Wor., leaf gall. Iowa, Minn. (3); Del., Iowa, Mass., Mich., Vt., Wis. (5); Vt. (6).

Tranzschelia cohaesa (Long) Arth. (O,I,II,III), rust. Tex. (7).

T. fusca (Pers.) Diet. (O,III), rust. Mass. to Va., Ill., and Minn., also Calif., Oreg. (5); Idaho, Oreg., Utah, Wash., Wyo. (7). Correlated with *T. pruni-spinosae*, q. v.

T. pruni-spinosae (Pers.) Diet. (O,I), rust. Kans., La., Nebr., Tex. (2); Vt. to Ala., Iowa, and Wis. (5). II and III on native *Prunus* spp.

T. suffusca (Holw.) Arth. (O,III), rust. Colo., Iowa, Mont., N.Dak., S.Dak., Alaska (4).

T. tucsonensis (Arth.) Diet. (O,I,II,III), rust. Ariz. (7).

Urocystis anemones (Pers.) Wint., leaf and stem smut. Minn., N.Y., Wis. (1); Kans., Tex. (2,7); Colo., N.Dak., N.Mex. (4); Maine to Del., Iowa, and Wis. (5); Iowa (6); Colo., Alaska (7).

U. sorosporioides Koern.—Alaska (7).

Anemonella

A. thalictroides (L.) Spach, rue-anemone.
Low, glabrous, perennial herb of woodlands

throughout the Eastern and Central States, sometimes grown in wild gardens.

Cercospora caulophylli Pk., leaf spot. Mo.
Erysiphe polygoni DC., powdery mildew. Iowa.
Puccinia rubigo-vera (DC.) Wint. (O,I), rust. Ind., Iowa, Mo.
Urocystis anemones (Pers.) Wint., leaf and stem smut. N.Y.

Aquilegia, columbine

(1) *A. caerulea* James
(2) *A. canadensis* L.
(3) *A. vulgaris* L.
(4) Other species.

Attractive perennial herbs: Native (1,2,4) or originally of Europe and Asia (3,4), extensively hybridized in cultivation and commonly grown for ornament.

Ascochyta aquilegiae (Rab.) Hoehn. (*Marssonia aquilegiae* (Rab.) Lind), leaf spot. Ill., Wis. (2); Conn., Iowa, Md., N.J., N.Y., Pa., Tex., Wis., Alaska (3,4). Various names, such as *Gloeosporium aquilegiae* Thuem., *Phyllosticta aquilegiae* Roum. & Pat., and *Actinonema aguilegiae* Grove, have been applied to this; probably also includes *Phyllosticta aquilegiae* Tehon & Daniels.
Botrytis cinerea Pers. ex Fr., gray-mold blight. Va. (3).
?B. streptothrix (Cke. & Ell.) Sacc.—Conn. (3).
Cercospora aquilegiae Kell. & Swing., leaf spot. Kans. (2,3), Oreg. (4).
Erysiphe polygoni DC., powdery mildew. Utah, Wyo. (1); Ill., Ind., Iowa, N.Y., Ohio, Pa., Wis. (2); N.J. (3); Tex., Alaska (4).
Gloeosporium aquilegiae Thuem.: See *Ascochyta aquilegiae.*
Haplobasidium pavoninum Hoehn., leaf spot. Alaska (3).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Kellermania alpina Ell. & Ev., on stems. Colo. (1).
Meloidogyne sp., root knot nematodes.
Mycosphaerella caerulea (Ell. & Ev.) Tracy & Earle, on stems. Colo. (1).
Phoma sp., stem rot. Pa. (3).
Phyllosticta aquilegiae Roum. & Pat. (1883), Tehon & Daniels (1925): See *Ascochyta aguilegiae.*
?Phyllosticta aquilegicola Brun., stem rot. Wash. (3). Considered a synonym of *Ascochyta aquilegiae* by some authors, q.v.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Puccinia rubigo-vera (DC.) Wint. (O,I), rust. Colo., N.Mex., Oreg., Utah, Wyo. (1); Calif., Colo., Idaho, Mont., Oreg., Wash., Wyo., (4). Forms on *Aquilegia* are referred to var. *agropyri* (Eriks.) Arth. by Arthur or to f. sp. *aquilegiae* by Mains. II and III on various native grasses.
Pythium mamillatum Meurs, root rot. ?Calif. (1).
Rhabospora clarkeana Sacc., on stems. N.Y. (2).
Rhizoctonia solani Kuehn, root rot, damping-off. Ill. (3).
Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. Del., Ohio, Pa., Tex. (3,4).
Septoria aquilegiae Penz. & Sacc., leaf spot. Ind., Mich., N.Y., Ohio, Vt., Wis. (2); Mich., Ohio, Va., Wis. (3); Conn. (4).
S. longispora Overh.—Pa. (2).
Sphaerella aquilegiae Ell. & Gall. (*?Mycosphaerella pachyasca* (Rostr.) Vest.), on leaves and stems. Mont. (4).
Urocystis sorosporioides Koern., leaf and stem smut. Utah (1,4).
Mosaic — unidentified virus. Iowa, Kans. (1); Iowa, N.Y. (2); N.J. (3).

Caltha, marshmarigold

(1) *C. palustris* L., kingcup, Mayblob.
(2) Other species.

Perennial herbs of bogs in eastern North America (1) or in the Far West (2); sometimes grown in wild gardens; furnish food for wildlife.

Cercospora calthae Pk. & G.W.Clint., leaf spot. Wis. (1).
Cylindrosporium sp., leaf spot. N.Y. (1).
Erysiphe polygoni DC., powdery mildew. Mich., Ohio, Wis. (1).
Fabraea rousseauana Sacc. & Bomm., leaf spot, Wis. (1), Calif. (2).
Puccinia areolata Diet. & Holw. (O,I,II,III), rust. Calif., Colo., Wash., Alaska (2).
P. calthae (Grev.) Lk. (O,I,II,III), rust. N.Y. to N.J., Iowa, and N.Dak. (1).
P. calthicola (*calthaecola*) Schroet. (O,I,II,III), rust. N.Y. to Iowa and Minn. (1).
P. gemella Diet. & Holw. (III), rust. Calif., Idaho, Mont., Oreg., Wash., Alaska (2). Correlated with *P. areolata*, q. v.
P. treleasiana Paz. (III), rust. Colo., Nev., Utah, Wash., Wyo. (2). Correlated with *P. calthicola*, q. v.
Ramularia calthae Lindr., leaf spot. N.Y., Wis. (1).
Synchytrium aureum Schroet., leaf gall. Wis. (1).

Cimicifuga, bugbane, rattletop

(1) *C. racemosa* (L.) Nutt., black-snakeroot, black cohosh.
(2) Other species.

Upright perennial herb of woodlands in the Eastern and Central States (1), may be grown in wild gardens, but (2) of Europe or east Asia are more frequently cultivated.

Ascochtya actaeae (Bres.) J.J. Davis, leaf spot. Conn., N.Y. (1).
Ectostroma afflatum (Schw.) Fr., leaf spot. Va. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. N.J. (2).

Clematis, clematis, virgins-bower

Clematis spp.

Numerous species of woody climbing vines (and some perennial herbs) native and widely distributed in the United States, especially *C. ligusticifolia* Nutt., western virgins-bower, *C. viorna* L., leatherflower, vasevine, and *C. virginiana* L., virgins-bower, devils-darning-needle. Numerous Asiatic and European species and hybrids are also cultivated.

Aecidium clematitis DC.: See *Puccinia rubigo-vera.*
Agrobacterium tumefaciens (E.F.Sm & Town.) Conn, crown gall. Minn., Tex.
Ascochyta clematidina Thuem. emend. Gloyer, leaf spot, stem rot. Miss., N.J., N.Y., Ohio, Oreg., W.Va., Wis.
Cercospora ligusticicola Bonar—Wash.
C. rubigo Cke. & Harkn., leaf spot. Calif., Tex., Wash.
C. squalidula Pk., leaf spot. Ala., Colo., Conn., Iowa, La., Mass., Miss., Mont., N.C., N.Dak., Nebr., N.Y., Okla., Oreg., Utah, Wash., Wis., Wyo.
Cylindrosporium clematidis Ell. & Ev., leaf spot. Ala., Conn., Del., Ind., Mich., Miss., N.Y., Wis.

Didymaria clematidis Cke. & Harkn., on leaves. Calif., Mont., Utah.
Diplodia spp., *D. hortensis* Sacc., and *D. thalictroicola* (Syd.) Allesch., on stems. Mich., N.Y.
Dothidella insculpta (Wallr.) Th. & Syd., on stems. Mont., N.Mex.
Dothiorella phomopsis Fairm., on stems. N.Mex.
Erysiphe polygoni DC., powdery mildew. Maine to Ga., Colo., Calif., Wash.
Glomerella cingulata (Ston.) Spauld. & Schrenk. (*?Gloeosporium clematidis* Sorauer), leaf spot. Fla.
Haplosporella clematidis (Dearn. & House) Petr. & Syd.: See *Physalospora obtusa.*
Hendersonia hortilecta Fairm., on stems. N.Y.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Keissleria montaniensis (Ell. & Ev.) Hoehn. (*Ceriospora montaniensis* (Ell. & Ev.) Berl.), on stems. Colo., Mont., N.Mex.
Leptosphaeria vagabunda Sacc., on dead stems. N.Y.
Macroplodia clematidis Dearn. & House—N.Y.
Macrosporium clematidis Pk., on leaves. Kans.
Meliola furcata Lév., black mildew. P.R.
Meloidogyne spp., root knot nematodes. Ala., Calif., Fla., Md., N.J., Ohio, Oreg., Wash.
Otthia fruticola (Ell. & Ev.) Ell. & Ev. (*?O. clematidis* Earle, *Parodiella fruticola* Ell. & Ev.), on stems. Colo., Mont., N.Mex.
Phleospora adusta Heald & Wolf, leaf blight. Tex.
Phyllosticta clematidis Ell. & Dearn. (*?Septoria clematidis* Rob. & Desm.), leaf spot. Mont., Utah, Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on stems. N.Y.
Puccinia rubigo-vera (DC.) Wint. (O and I), rust. The vars. *agropyri* (Eriks.) Arth. occurring on native *Clematis* sp. in the Rocky Mountain and Pacific Coast States, and *agropyrina* (Eriks.) Arth. on native *Clematis* spp. in the Eastern and Central States to Tex. and Ariz. have been distinguished (Arthur); and several additional geographic and host races also have been named (Mains). Races of this rust occur also on the introduced species. II and III on native grasses.
P. pulsatillae Kalchbr. (III), rust. On *C. lasiantha* Nutt. —Calif.
P. stromatica Berk. & Curt. (III), rust. Ala.
Pythium sp.—Ala.
Ramularia clematidis Dearn. & Barth., leaf spot. Mont., Tex.
R. saximontanensis Solh.—Wyo.
Septogloeum sp. (*?Cylindrosporium*)—La.
Septoria clematidis Rob. & Desm., leaf spot. Wash., Wis.
S. jackmani Ell. & Ev.—N.Y. Distinct from *S. clematidis* according to Gilman and Archer.
Sphaerella applanata Ell. & Ev., leaf spot. Mont., Tex.
Sphaeropsis clematidis Dearn. & House: See *Physalospora obtusa.*
Tranzschelia viornae Arth. (II,III), rust. Tex.
Urocystis carcinodes (Berk. & Curt.) Fisch. v. Waldh., smut. On *C. pseudoalpina* (Kuntze) Nelson in Utah.

Coptis, goldthread

(1) *C. groenlandica* (Oeder) Fern., canker-root; sometimes confused with *C. trifolia* (L.) Salisb.
(2) Other species.

Small perennial herbs of bogs and woods in the Northern States; sometimes grown in wild gardens.

Mycosphaerella coptis (Schw.) House, leaf spot. Maine, N.Y., Vt. (1). Usually associated with *Septoria coptidis*, q. v.
Phyllosticta helleboricola Massal. var. *coptidis* Sacc. & Scalia, leaf spot. Alaska (2).
Septoria coptidis Berk. & Curt., leaf spot. Mich., N.Y., Vt., Wis. (1); Idaho, Wash., Alaska (2).
Vermicularia coptina Pk., leaf spot. N.Y. (1).

Delphinium, larkspur

(1) *D. ajacis* L., rocket larkspur.
(2) *D. cardinale* Hook., scarlet larkspur.
(3) *D. cultorum* Voss, or *D. hybridum* Hort.
(4) *D. elatum* L., candle larkspur, including *D. cheilanthum* Fisch., garland larkspur.
(5) *D. grandiflorum* L., bouquet larkspur.
(6) *D. nudicaule* Torr. & Gray, red larkspur.
(7) Other species.

Numerous perennial and a few annual herbs, mostly introduced and grown for ornament; also many native species, some of ornamental value. The most commonly cultivated annual type is (1) of Europe. The perennial larkspurs of gardens are cultivars, sometimes collectively called (3) and are derived mainly from (4,5) which are of Asiatic or European origin. Native species most commonly used in cultivation are (2,6).

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Wash. (3).
Ascochyta aquilegiae (Rab.) Hoehn., leaf spot. Conn. (3).
Botrytis cinerea Pers. ex Fr., gray-mold blight, bud rot. N.Y. (1); Conn., Mass., Miss., N.Y., Wis, W.Va. (3).
Cercospora delphinii Thuem., leaf spot. Colo., Mo., Tex. (7).
Cercosporella herpotrichoides Fron., on stems. Idaho, Oreg., Wash.
Diaporthe arctii (Lasch) Nits., stem canker. Md., N.C., N.Y., Ohio, Pa. (1); N.Y. (3).
Didymella delphinii Earle, on stems. Nev. (7).
Diplodina delphinii Laskaris, collar rot, leaf spot, inflorescence and seed-pod blight. Calif., N.Y. (3); Conn., N.J., N.Y. (4). Reported on (1) in Calif. According to Laskaris, only on varieties and hybrids of (4).
Ditylenchus dipsaci (Kuehn) Filip., leaf and stem nematode. Oreg., Wash. (7).
Entyloma winteri Linhart, white smut. Calif. (7).
E. wyomingense Zundel—Wyo. (7).
Erwinia atroseptica (Van Hall) Jennison (*E. phytophthora* (Appel) Holland, *Pectobacterium delphinii* Waldee), foot rot, blackleg. N.Y. (1); Calif., Minn., N.Y. (3); Calif. (2,7). Probably general on larkspur outdoors and in greenhouses; on delphinium in warm areas. Possibly syn. of *Erwinia carotovora*, q. v.
E. carotovora (L.R.Jones) Holland, bacterial collar rot. Calif., N.Y. (1,3).
E. phytophthora (Appel) Holland: See *Erwinia atroseptica.*
Erysiphe cichoracearum DC., powdery mildew. Mass., Minn., N.Y., Wash. (3).
E. polygoni DC.—Calif. (1); general (3); Maine. Pa. (4); N.Y. (5); some varieties derived from (4,5) are resistant; also on some native species but others are resistant.
Fusarium oxysporum Schlecht. f. *delphinii* Laskaris, stem canker, wilt. N.Y. (3,4,5). A similar disease, attributed to *Fusarium* spp., is reported in

Ariz., Conn., Fla., Mass., N.J., N.Y., Ohio, and Wash. (3).

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

Meloidogyne spp., root knot nematodes. Ariz., N.J., Va., Wash. (3); Va. (4).

Mycosphaerella delphiniicola Earle, on stems. Colo. (7).

Ovularia delphinii Solh., leaf spot. Wyo. (7).

Pectobacterium delphinii Waldee: See *Erwinia atroseptica.*

Phoma sp., stem canker. Conn., N.J., N.Y. (3).

P. delphiniicola Tracy & Earle, on stems. Colo., Tex. (7).

Phyllosticta sp., leaf spot. N.Y. (3).

P. delphinii Clements—Colo. (7).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,7).

Phytophthora sp., stem rot. Minn. (4).

Pratylenchus pratensis (De Man) Filip., root nematode. U. S. (Plant Dis. Rptr. 21:153).

Pseudomonas delphinii (E.F.Sm.) Stapp, bacterial leaf spot, "black disease" (in part.) Maine to Va., Tex., and Minn.; rare in Pacific Coast States (3,4,5).

Puccinia delphinii Diet. & Holw. (III), rust. Calif (7).

P. rubigo-vera (DC.) Wint. (O,I), rust. Nebr. to Tex., N.Mex., Calif., and Wash. on various native species. Assigned to vars. *agropyri* (Eriks.) Arth. and *agropyrina* (Eriks.) Arth. by Arthur; to f. sp. *delphinii* by Mains; with II and III on *Agropyron* and other grasses.

Pythium aphanidermatum (Edson) Fitzp., root rot. Va. (1).

P. ultimum Trow, root and stem rot. Calif., N.Y. (1,2,3); perhaps cosmopolitan.

P. vexans d By., root and stem rot. Calif. (1).

Ramularia delphinii Jaap, leaf spot. Calif., Colo., Utah (7).

R. sheldoni Trott.—Colo. (7).

Rhizoctonia solani Kuehn, root rot, damping-off. Cosmopolitan (3,4,5,7).

Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. Mo., Tex. (1); Del., Ill., Mass., Mich., Ohio, Wash. (3,4,5); Tex. (7).

Sclerotium delphinii Welch, collar and stem rot. Kans., N.C. (1); Mass. to Va., Tex., and Minn.; Calif. Wash. Usually regarded as a form only of the following.

S. rolfsii Sacc., southern blight, collar and stem rot. Tex. (1,7); N.Y. to Fla., Tex., and Calif., T.H. (3); Fla. (5).

Septoria delphinella Sacc., leaf spot. Ill. (1); Kans., Wis. (7).

Sphaeromyces delphinii Pk., on stems. Utah (7).

Sphaerotheca humuli (DC) Burr., var. *fuliginea* (Schlecht.) Salm., powdery mildew. Calif. (1,3,7).

Synchytrium aureum Schroet., leaf gall. Iowa. (7).

Urocystis sorosporioides Koern., leaf and stem smut. Calif., Ky., Va. (7).

Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (1), Wash. (3).

Volutella sp., stem canker. Md. (3).

Calico—virus (*Marmor aevi* Holmes, Delphinium virus 1 K.M.Sm., in part). Calif. (1,3,4,5); Idaho, Wash. (3,4,5). See also Mosaic.

Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1), ?Wash. (3). Experimental infection of (6) is reported in Calif.

Mosaic—virus(es). In part calico virus (q.v.); in part probably cucumber mosaic virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.), reported in Fla. (1); Calif., Ky. (3); also unidentified in Kans., Mont., Nebr., Pa. (3,4,5).

Ring spot—virus (*Annulus delphinii* Holmes, ?Delphinium virus 2 K.M.Sm., in part). Calif. (3,4,5). As reported in Ky., Minn., N.Y., and ?Wash. on (3), the virus may belong to the tobacco ring spot group (*Marmor annularium* McK. or *Annulus tabaci* Holmes, Nicotiana virus 12 K.M.Sm.).

Spotted wilt—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (1,3,4,5). Baker says this virus is not known on (1).

Stunt, witches'-broom—virus(es). In part aster yellows virus, (western and ?eastern strains) singly or associated with other viruses as calico, ring spot, and virescence (q.v.). Ind., N.Y., Wash. (3, 4,5).

Virescence, "greens"—virus, probably aster yellows. Pacific Coast States, Idaho, Utah (3,4,5); eastern strain—Ind. (3,4,5); N.Y. (1,3,4,5); also observed in Calif. (1,3,4,5) and attributed to the western strain of this virus; also reported in Oreg., Wash. (1,3,4,5).

Baker combines these two preceding viruses as one disease, preferably called stunt; says it is confined to Pacific coast and Rocky Mountain area and infects all kinds of larkspur and delphinium.

Yellows—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif. (1,3,4,5); ?Idaho, ?Oreg., Utah, Wash. (3,4,5). Perhaps also the eastern or typical strain of this virus as a component of stunt reported in Conn., Ind., N.J., N.Y. (3).

"Blacks," black disease—a confused name, the condition to which it is applied often caused by the cyclamen mite (*Tarsonemus pallidus* Banks), with or without infection by *Pseudomonas delphinii;* sometimes associated with virus infection, such as ring spot and spotted wilt.

Chlorosis—physiological, attributed to low temperature and wet soil.

Variegation—noninfectious, seed-transmitted leaf-color anomalies. Calif. (3,4,5).

Helleborus

H. niger L., Christmas-rose.

Hardy perennial herb of Europe, grown as a garden flower or under glass for winter bloom.

Botrytis cinerea Pers. ex Fr., flower spot. N.J.

Coniothyrium hellebori Cke. & Mass., black leaf spot. Md., N.Y., Oreg.

Gloeosporium sp., flower spot. N.J.

Sclerotium delphinii Welch, stem rot. ?N.Y.

Hepatica, liverleaf, hepatica, noble liverwort

(1) *H. acutiloba* DC. and *H. americana* (DC.) Ker-Gawl.

(2) Other species.

Perennial herbs of woodlands throughout eastern North America: (1) sometimes grown in wild gardens; (2), of Europe, more commonly cultivated.

Colletotrichum hepaticae Pk., on leaves. N.Y., Wis. (1).

Discosia artocreas Tode ex Fr., secondary leaf spot. Iowa (1).

Plasmopara pygmaea (Ung.) Schroet., downy mildew. Iowa, N.Y., Wis. (1); Ill., Pa. (2). Also var. *fusca* (Pk.) J.J.Davis in Wis. and N.Y. (1).

Septoria hepaticae Desm., leaf spot. Mich., N.C. (1).

Tranzschelia pruni-spinosae (Pers.) Diet. (O,I), rust. Mass. to Md., Tenn., and Minn. (1,2). II and III on native *Prunus* spp.

Urocystis anemones (Pers.) Wint., leaf and stem smut. N.Y. to Ind., Mo., and Minn. (1); Wis. (2).

Hydrastis, orangeroot, yellow-puccoon

H. canadensis L., goldenseal, "turmeric."

Perennial herb of woodlands in the Eastern and Central States, sometimes cultivated for rhizomes used in pharmacy.

Alternaria sp., leaf blight. Mich., N.Y., Ohio.

Botrytis sp. (*B. hydrastis* Whet., nomen nudum), leaf blight. Conn. to N.C., Ind., and Wis.; Wash.

Fusarium sp., wilt. Ill., N.Y., Ohio, Wash.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Meloidogyne spp., root knot nematodes. Mich., Ohio, Tex., Wash.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

?*Phytophthora cactorum* (Leb. & Cohn) Schroet., stem rot. N.C.

Rhizoctonia solani Kuehn, root rot. N.C.

MOSAIC—unidentified virus. Conn.

Paeonia, peony

(1) *P. lactiflora* Pall. (*P. albiflora* Pall.).
(2) *P. officinalis* L., peony.
(3) *P. suffruticosa* Andr., tree peony.

Hardy perennial herbs (1,2) or small shrub with showy flowers (3), widely cultivated for ornament. The common garden peonies are derived from (1) of eastern Asia, to which records without specific designation are referred; also in part from (2) of southern Europe and other species; (3) is native to China.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Mich (1), Md. (2).

Alternaria sp., leaf spot (?secondary). Occasional in Northeastern and Central States (1,2).

Armillaria mellea Vahl ex Fr., root rot. Calif., Iowa, Mich., Oreg. (1).

Botrytis spp., blight, bud rot, root rot. General (1,2). Ususally referred to *B. paeoniae* Oud., sometimes to *B. cinerea* Pers. ex Fr., without distinguishing symptoms; the former, perhaps, to be regarded as only a physiological race.

Cercospora paeoniae Tehon & Daniels, leaf spot. Ill. (2).

C. variicolor Wint., leaf spot. Pa. to N.C., Nebr., and Wis. (1).

Cladosporium paeoniae Pass., leaf blotch. General (1,2); Mass. (3). *C. herbarum* Lk. ex Fr. is occasionally reported but is probably general as a secondary invader of leaf and bud necroses. A special form of one or the other of these is perhaps the cause of one kind of anthracnose (stem, leaf, and flower spot) reported in Md., Pa., and probably elsewhere.

Coniothyrium sp. (?*C. fuckelii* Sacc.), stem canker, wilt. Calif. (3).

Cryptostictis paeoniae Tehon & Daniels, leaf spot. Ill. (2).

Ditylenchus dipsaci (Kuehn) Filip., leaf and stem nematode. Wash. (1), N.J. (2).

Erysiphe polygoni DC., powdery mildew. Tex. (1).

Fusarium sp., root rot, stem rot (?secondary). Colo., Ind., Mo., Nebr., N.J., Okla. (1).

Gloeosporium sp., anthracnose. Ill., N.J. (1); probably this also in Kans., Md., Mass., N.C., Pa., Va., and elsewhere. SEE ALSO *Cladosporium*.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Meloidogyne spp., rot knot nematodes. N.Y. to N.C., Okla., and N.Dak., also Pacific Coast States (1,2,3).

Monochaetia paeoniae (Maubl.) Sacc. & D. Sacc., on stems. Md., N.J. (3).

Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot. Md., Pa. (1).

Phyllosticta spp., leaf spot. N.J., Pa., Va.

P. baldensis Massal.—Alaska (1), Pa. (2).

P. commonsii Ell. & Ev.—N.J. to Va. and Ind., also Okla. (1,2).

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex. (1).

Phytophthora cactorum (Leb. & Cohn) Schroet. (*P. paeoniae* Cooper & Porter), tip blight, crown rot. Conn., Ill., Ind., Kans., Minn., N.J., N.Y., Ohio; probably this also reported as *Phytophthora* sp. in Maine and Wis. (1,2).

Rhizoctonia solani Kuehn, root and stem rot. Conn., Ill., Md., Minn., N.Y., Pa., Va. (1).

Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. Ill., Maine, Md., Minn., N.J., N.Y., Ohio, Okla. (1).

Sclerotium rolfsii Sacc. southern blight. Miss., Tex. (1).

Septoria paeoniae West., leaf spot, ?stem canker. Maine, Mich., Minn., N.J., N.Y., Oreg., R.I., Wash., Wis. (1). Usually reported as var. *berolinensis* Allesch. but perhaps not differing from the type.

Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Conn. (1).

Verticillium albo-atrum Reinke & Berth., (including *V. dahliae* Kleb.), wilt. Ill., Kans., Md., N.Y., Ohio (1,2).

CROWN ELONGATION, ?WITCHES'-BROOM—cause unknown, virus suspected. Mo., N.J., N.Y., Ohio, Okla. (1).

MOSAIC, RING SPOT—virus (Paeonia virus 1 K.M.Sm.). Mass. to Va., Kans., and Mich., also Calif and Wash.

WITCHES'-BROOM—cause unknown, virus suspected; perhaps same as crown elongation disease. Md., N.Y., Va. (1).

BUD BLAST—causes various, often unknown, but only in part *Botrytis* infection, q.v.; also attributed to root knot, Le Moine disease, and unidentified viruses. General (1,2); attributed to potassium deficiency —N.Y.

LE MOINE DISEASE, CLUBROOT—cause unknown, virus suspected but often confused with root knot (see *Meloidogyne* spp.) and perhaps is a late phase of this. Ill., Ind., Mich., Minn., Mo., Ohio, Wash. (1).

"MEASLES," ?ANTHRACNOSE. SEE *Cladosporium* and *Gloeosporium*.

Ranunculus, buttercup

(1) *R. acris* L., meadow buttercup.
(2) *R. asiaticus* L., turban, or Persian buttercup.
(3) *R. bulbosus* L.
(4) *R. delphinifolius* Torr., water buttercup.
(5) *R. repens* L., creeping buttercup.
(6) *R. septentrionalis* Poir, swamp buttercup.
(7) Other species.

Numerous, mostly perennial, herbs: (1,3,4,5,6) native or naturalized throughout the United States in bogs and meadows, sometimes troublesome weeds in grassland and cultivated ground but many of food value to wildlife; (2) an introduced species, grown for ornament.

Ascochyta infuscans Ell. & Ev., leaf spot. Wis. (7).

Botrytis cinerea Pers. ex Fr., gray mold. Calif., Wash. (2); N.Y., Wis. (7).

Ceratobasidium anceps (Bres. & Syd.) Jacks., leaf rot. Wis. (6).

Cercospora ranunculi Ell. & Holw., leaf spot. Iowa, Wis., (5,6).

Cylindrosporium ficariae Berk., leaf spot. Wash. (7).

Didymaria didyma (Ung.) Pound, leaf spot. Wis. (1);

Ill., Mass., Wis. (5); Ind., Iowa, Mich., Miss., N.Y., Wis. (6); also other species in this range and Alaska.

Ditylenchus dipsaci (Kuehn) Filip., leaf and stem nematode. Oreg.

Doassansia ranunculina J.J.Davis, leaf smut. Ind., Wis. (4).

Entyloma microsporum (Ung.) Schroet., white smut. Ill., Ky., Va. (5); Ill., Ind., Iowa, Wis. (6); also other species in this range and Colo.

E. ranunculi (Bon.) Schroet.—Ind. (4); Oreg., Wash., Wis. (7).

Erysiphe polygoni DC., powdery mildew. Frequent on various species in the Eastern and Central States, especially (1), occasionally (4,5); Miss., Mont., Nev., Wyo. (7).

Fabraea ranunculi (Fr.) Karst., leaf spot. N.Y. (1,7); Wis. (6,7); Calif., Nebr., Alaska (7).

Ovularia decipiens Sacc., leaf spot. N.Y. (1,7), Tex. (5), Wyo. (7).

Peronospora ficariae Tul. [Tul. ex d By. if based on oospores], downy mildew. Occasional from Mass. to Md., Iowa, and Minn. (1,3,5,6,7); Calif. (5). The forms on certain hosts are sometimes given specific rank, such as *P. hiemalis* Gäum. in Mass. and N.Y. (1); *P. pennsylvanica* Gäum. in N.Y. (7); *P. ranunculi* Gäum. in Mass. (3); Mich. (5).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (5,7).

Puccinia andina Diet. & Neger (III), rust. Ill., Ind. (6).

P. eatoniae Arth. var. *ranunculi* Mains (O,I), rust. Conn. to S.C., Miss., and N.Dak.; also Calif. and Colo. (7). II and III on *Sphenopholis* spp.

P. ranunculi Blytt. (III), rust. Ariz., Colo., Utah, Wash., Wyo., Alaska (7).

P. rubigo-vera (DC.) Wint. (O,I), rust. Wis. to Tex., Calif., and Wash., also Alaska, on various species including (1,5,6) and commonly on *R. cymbalaria* Pursh. The forms on the latter have been distinguished as f. sp. *alpina* Mains and *pucciniellae* Mains, with II and III on *Hordeum*, *Puccinella*, and ?*Poa*.

Pythium spp., root and stem rot. Calif. (2). Species reported include: *P. debaryanum* Hesse, *P. irregulare* Buis., and *P. ultimum* Trow.

Ramularia aequivoca (Ces.) Sacc. (*R. gibba* Fckl.), leaf spot. Ill., Iowa, Wis. (5,6,7); Oreg., Alaska (7). Said to be the conidial stage of *Stigmatea ranunculi* Fr.

R. ranunculi Pk.—Maine, N.Y., Vt. (1); Ind., Miss. (6); Ind., Iowa, Md., N.Y., Vt. (7).

R. ranunculi-lyallii Dearn. & Barth.—Wash. (7).

Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. Ariz., Calif. (7).

Sclerotium rolfsii Sacc., stem rot. Calif. (7).

Septocylindrium ranunculi Pk., leaf spot. N.Y. (1); Ill., N.Y., Wash., Wis. (7).

Septoria spp., leaf spot. Variously identified as *S. ficarioides* Pk. in Nebr. (7); *S. polaris* Karst in Wis. (6,7); La., Miss. (7); and *S. ranunculaccarum* Lév. in La., Miss.; *Septoria* sp. in Pa. (1), Nebr. (7).

Sphaerotheca humuli (DC.) Burr., powdery mildew. Colo. (7).

Stigmatea ranunculi Fr., on leaves. Calif. (7).

Synchytrium anomalum Schroet., leaf gall. Iowa (7).

S. aureum Schroet.—Ill. (5); Calif., Wis. (7).

S. cinnamomeum J.J.Davis—Wis. (6,7).

Urocystis anemones (Pers.) Wint., leaf and stem smut. Ill., Utah, Wyo. (7).

Uromyces alopecuri Seym. (O,I), rust. Colo., Tex. (7).

U. dactylidis Otth. (O,I), rust. Mass. (5).

U. jonesii Pk. (O,I,III), rust. Calif., Colo., Mont., Wyo. (7).

Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Tex. (7).

Yellows—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.). Calif. (2).

Thalictrum, meadowrue

(1) *T. alpinum* L.
(2) *T. aquilegifolium* L.
(3) *T. dasycarpum* Fisch. & Lall., purple meadowrue.
(4) *T. dioicum* L., early meadowrue, quicksilverweed.
(5) *T. polygamum* Muhl., tall meadowrue, muskratweed, king-of-the-meadow.
(6) Other species.

Perennial herbs in meadows and open woods throughout the Eastern and Central States, also some western or arctic species, wildlife-food plants and sometimes grown for ornament (1,3,4,5,6); (2) of Europe and other introduced species are more commonly cultivated.

Ascochyta clematidina Thuem. f. *thalictri* J.J.Davis, leaf spot. Wis. (3,4).

Cercospora fingens J.J.Davis, leaf spot. Wis. (3,4), Ill. (6).

Cercosporella filiformis J.J.Davis, leaf spot. Wis. (3).

Cylindrosporium thalictri (Ell. & Ev.) J.J.Davis, leaf spot. Ind., Kans. (3); Wis. (3,4).

Diplodia thalictri Ell. & Dearn., on stems. N.Y. (5).

Entyloma thalictri Schroet., white smut. Ill. (3,6); Wis. (3,4,6); Ind. (4); Conn., N.H. (5).

Erysiphe polygoni DC., powdery mildew. Mass. to Pa., Ill., and N.Dak., usually on (3) and (5), occasionally on (6).

Gloeosporium thalictri J.J.Davis, leaf spot. Wis. (3).

Mycosphaerella fendleri Tracy & Earle, on stems. Colo. (6).

M. punctata Dearn. & House, on stems. N.Y. (5).

M. thalictri (Ell. & Ev.) Lindau, leaf spot. Iowa, Wis. (3); Iowa, N.J., N.Y., Vt. (4); Iowa, N.Y., Wis. (5); Iowa, Pa. (6).

Phoma spp., on stems. Species reported include: *P. nebulosa* (Pers. ex Fr.) Berk. in Calif. (6); *P. spermoides* Dearn. in N.Y. and Pa. (3); *P. thalictrina* Sacc. & Malbr. in N.Mex. (3,6).

Phytophthora thalictri G.W.Wils. & J.J.Davis, downy mildew. Wis. (3,6); Conn., N.Y., Wis. (5).

Puccinia cockerelliana Bethel (O,I), rust. Colo. (6). II and III on *Festuca* spp.

P. rubigo-vera (DC.) Wint. (O,I), rust. Colo. (1); Mich. (2); Northeastern and North Central States to Colo. and Mont. (3,4,5); also on other species in this range and to Calif. and Wash. A number of special forms have been described, with II and III commonly on native species of *Agropyron*, *Elymus*, and *Hordeum*.

P. septentrionalis Juel (O,I), rust. Alaska (1), ?Calif. (6). II and III on *Polygonum viviparum* L.

Pyrenopeziza thalictri (Pk.) Sacc., on stems. N.Y. (6).

Septoria thalictri Ell. & Ev., leaf spot. Kans. (3). Perhaps the conidial stage of *Mycosphaerella thalictri*, q.v.

Sphaeropsis thalictri Ell. & Fairm., on stems. N.Y. (6).

Tranzschelia pruni-spinosae (Pers.) Diet. (O,I), rust. Colo., Iowa, Kans., N.Dak., Nebr., S.Dak. (3); Ind., Iowa, Pa. (4); Ohio (5). II and III on native *Prunus* spp.

T. thalictri (Chev.) Diet. (O,III), rust. Eastern and Central States to Miss. (3,4,5); N.Mex., Calif., and Idaho (6); on *T. fendleri* Engelm. in Ariz.

Urocystis sorosporioides Koern., leaf and stem smut. N.Y. (5); Ariz., Mass., N.Y., Utah (6).

Trautvetteria, false-bugbane

(1) *T. carolinensis* (Walt.) Vail, tassel-rue.
(2) *T. grandis* Nutt.

Perennial herbs: (1) in the East and South, (2) in the Far West; sometimes grown in wild gardens.

Peronospora ficariae Tul., downy mildew. Tenn. (1).
Puccinia pulsatillae Kalchbr., rust (III). Idaho, Oreg., Wash. (2).
Septoria trautvetteriae Ell. & Ev., leaf spot. W. Va. (1).
Urocystis anemones (Pers.) Wint., leaf and stem smut. Utah (2).

Trollius, globeflower

(1) *T. albiflorus* (A. Gray) Rydb.
(2) *T. laxus* Salisb., spreading globeflower.
(3) Other species.

Perennial herbs: (1) in the Rocky Mountain States, (2) in the East; (3), of Europe or Asia, grown for ornament.

Ascochyta sp., leaf spot. N.Y. (3).
Cylindrosporium montenegrinum Bub., leaf spot. Wyo. (1).
Mycosphaerella hypsicola (Ell. & Ev.) Lindau, on stems. Colo. (1).
Phomopsis trollii Fairm., on stems. N.Y. (3).
Phyllosticta trollii Trail, leaf spot. Wyo. (1).
Urocystis anemones (Pers.) Wint., leaf and stem smut. N.Y. (2), Md. (3).

Xanthorhiza

X. simplicissima Marsh., shrub-yellowroot.

Low shrub, used for ground cover and ornament. Range 27,28,29,30.

Phyllosticta xanthorhizae Ell. & L.W.Nutt., leaf spot. N.C., W.Va.

RESEDACEAE

Reseda

R. odorata L., mignonette.

Annual or biennial herb of the Mediterranean region, grown in gardens and under glass for fragrant flowers.

Cercospora resedae Fckl., leaf spot. Mass. to Miss., Mo., and Iowa.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla.
Rhizoctonia solani Kuenn, damping-off, root rot. Conn., Tex.
Verticillium albo-atrum Reinke & Berth., wilt. N.Y.

RHAMNACEAE

Berchemia

B. scandens (Hill) K. Koch, rattanvine, supplejack.

Woody, high-climbing, twining shrub of range 20,25,28,29,30.

Glonium curtisii (Duby) Lohman, on dead branches. N.C. to Fla. to La.
Puccinia coronata Cda. (O,I), rust. Va. to La. II and III on *Avena* and wild grasses.

Ceanothus

(1) *C. americanus* L., Jersey-tea.
(2) Other species.

Low shrub (1) of woods and rocky banks in range 17,20,22,24,25,26,28,29,30, its leaves considered a substitute for tea during the American Revolution; (2) shrubs or small trees of the western Plains and the Pacific coast.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Wash. (2).
Armillaria mellea Vahl ex Fr., root rot. Calif. (2).
Botryosphaeria ribis Gross. & Dug., on dead stems. Occasional (1).
Camarosporium ceanothi Dearn., on dead stems. Md. (1). Probably an imperfect stage of *Cucurbitaria ceanothi*, q.v.
Cenangium aureum Ell. & Ev., on dead stems. Colo. (2).
Cercospora ceanothi Kell. & Swing., leaf spot. Central States (1); Kans., Wis. (2).
Cucurbitaria ceanothi Dearn. & House, on dead stems. N.Y. (1).
Cylindrosporium ceanothi Ell. & Ev., leaf spot. Pacific Coast States (2).
Cytospora ceanothi Schw., on twigs. Pa. (1).
Dasyscypha succinea (Phill.) Sacc., on dead twigs. Calif. (2).
Diaporthe ceanothi Dearn. & House—N.Y. (1).
D. minuta Dearn. & House (*Cryptodiaporthe ceanothi* Dearn. & House)— (1).
Didymella wehmeyeri Dearn. & House, on dead stems. N.Y. (1). *Diaporthe minuta* Dearn. & House was also present on the specimen.
Didymosphaeria ceanothi Cke. & Harkn., on twigs. Calif. (2).
D. housei Dearn., on dead stems. N.Y. (1).
Diplodia ceanothi Ell. & Barth. (?*D. mutila* (Fr.) Mont.), on stems. Kans. (2).
Harknessia aggregata Syd., on old leaves. Utah (2).
Leptosphaeria ceanothi (Cke. & Harkn.) Berl. & Vogl., on twigs. Calif. (2).
Macrophoma ceanothi Dearn. & House (=*Myxofusicoccum peckianum* Petr. & Syd.), on dead stems. N.Y. (1).
Microdiplodia ceanothi Dearn. & House, on dead stems. N.Y. (1). Associated with *Didymosphaeria*, q.v.
Microsphaera alni DC. ex Wint., powdery mildew. Widespread, Ga. (1).
Phyllosticta ceanothi Miles, leaf spot. Miss. (1).
Physalospora ceanothina (Pk.) Sacc., on stems. Ga., N.Y. (1).
P. obtusa (Schw.) Cke., on twigs. Occasional (2).
Puccinia tripsaci Diet. & Holw. (O,I), rust. Colo., Kans., Nebr., Wis. (2). II and III on *Andropogon* and *Tripsacum* spp.
Rhizobium sp., root nodules (symbiotic). General (1).
Schizophyllum commune Fr., sapwood rot. Calif. (2).
Septoria ceanothi Dearn., leaf spot. Idaho (2).
Sphaeropsis ceanothi Dearn. & House: SEE *Physalospora obtusa*.
Thyridium ceanothi Dearn. & House, on dead twigs. N.Y. (1).
T. tuberculatum Rehm, on dead branches. Calif. (2).

Colubrina

C. reclinata (L'Hér.) Brongn.
Small tree of the West Indies.

Dictyopeltis (Asterina) colubrina (Ell. & Kelsey) Th., black leaf patch. V.I.

Condalia

C. spathulata A. Gray, squawbush.
Xerophytic shrub. Range 10,11,16,17; occasionally cultivated.

Phoradendron californicum Nutt., mistletoe. Calif.

Gouania

Gouania spp.
Shrubs or vines of tropical America, sometimes planted for ornament.

Catacaumella gouaniae F.L.Stevens, black mildew. P.R.
Irenopsis tenuissima F.L.Stevens, black mildew. P.R.
Puccinia gouaniae Holw. (O,I,II,III), rust. West Indies and Central America.
P. invaginata Arth. & Johnston (II,III), rust. Fla., West Indies.

Rhamnus, buckthorn

(1) *R. alnifolia* L'Hér., alder-leaved buckthorn.
Low shrub of low-lying woods and meadows in range 4,12,18,21,22,23,24,26,27.

(2) *R. californica* Esch., California buckthorn, coffeeberry.
Evergreen shrub of range 1,3,4,5,10; cultivated for ornament in zone 7.

(3) *R. caroliniana* Walt., Carolina, or yellow, buckthorn, Indian cherry.
Shrub or small tree of range 17,20,22,25,28, 29,30; grown for ornament, zone 5.

(4) *R. cathartica* L., common buckthorn.
Small tree or shrub of Europe and western Asia, long cultivated for hedges, zone 2; naturalized in the Northeastern and Central States; bark and fruit used medicinally and also yield a dye.

(5) *R. crocea* Nutt. and var. *ilicifolia* (Nutt.) Greene, hollyleaf buckthorn, red-berried buckthorn.
Shrub of range 3,5,11; cultivated for ornament in zone 7.

(6) *R. lanceolata* Pursh, lance-leaved buckthorn.
Tall shrub of thickets and woods' borders in range 22,25,27,29.

(7) *R. purshiana* DC., cascara buckthorn, cascara sagrada.
Shrub or small tree of range 1,2,3,4,6,7,9,11, 12; cultivated, zone 6; used medicinally.

(8) *R. smithii* Green
Shrub of range 11,13,14.

Botryosphaeria ribis Gross. & Dug., on branches. Wash. (7).
Capnodium sp., sooty mold. Calif. (2).
Cercospora aeruginosa Cke., leaf spot. Mo., Nebr., S.C. (6).
C. bacilligera (Berk. & Br.) Wr., leaf spot. On *R. frangula* L.
C. rhamni Fckl., leaf spot. Wis. (1); La., Nebr., Tex. (3); N.J., N.Y., Wis. (4).
Ceuthospora foliicola (Lib.) Cke., on leaves. Calif. (5).
Cylindrosporium rhamni Ell. & Ev., leaf spot. Idaho (7).
Daedalea unicolor Bull. ex Fr., heart rot. Wash. (7).
Dermatea sp.—Wash. (7).
D. frangulae (Pers. ex Fr.) Tul., on branches. Calif., Idaho (7).
Diaporthe berlesiana Sacc. & Roum. (?*D. syngenesiae* (Fr.) Fckl.), on branches. Nebr. (1).
Diplodia frangulae Fckl., on twigs. Calif. (2).
Fomes igniarius (L. ex Fr.) Kickx, white heart rot. Idaho (7).
Lophiostoma triseptatum Pk.—Nebr. (6).
Marssonina rhamni (Ell. & Ev.) Magn., leaf spot. Wash. (7).
Microsphaera alni DC. ex Wint., powdery mildew. Wis. (1).
Ovularia rhamnigena Ell. & Ev., on leaves. Oreg. (2).
Phaeosphaerella rhamni Bonar, leaf spot. Calif. (2).
Phoma communis Rob. and *P. rhamnicola* Cke. & Harkn., on twigs. Calif. (2).
Phyllosticta rhamni West. —Wis. (4). (?*P. rhamnigena* Sacc.)
P. rhamnigena Sacc., leaf spot. Wash. (7).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Physalospora obtusa (Schw.) Cke., on branches. Ga. (3).
Pleospora frangulae Fckl., on leaves. Calif. (2).
Polyporus subspadiceus Fr.—Mo. (6).
Puccinia coronata Cda. (O,I), crown rust. Ind., Tenn., Tex. (3); Maine to Pa., Mo., and Mont. (4); Ind., Iowa, Mo., Nebr., Wis. (6); Mich., Mont., Tex. to Oreg. and Wash. (7); Colo. (8). II and III on *Avena* and, in the broad sense of the species, on many native grasses. By some authorities the rust on *R. cathartica* is limited to the oat race, *P. coronata* var. *avenae* Fraser & Led. (*P. coronata avenae* Eriksss. in part); by others the Calamagrostis race, *P. coronata calamagrostis* Fraser & Led. (*P. coronata calamagrostis* Eriks., in part), is included.
P. coronata var. *calamagrostis* Fraser & Led. (O,I), crown rust. N.H. to Ind., Mo., and Wash. (1). II and III on *Calamagrostis canadensis* (Michx.) Nutt. and other grasses.
P. coronata var. *festucae* Eriksss., rust. Colo. (8).
P. mesneriana Thuem. (III), rust. Calif. (2,5). Also on *R. crocea* var. *pirifolia* (Greene) Little and var. *insularis* (Greene) Sarg. in Calif.
Septoria blasdalei Sacc. & Syd., leaf spot. Calif., Idaho, Oreg., Tex. (7).
S. rhamni-catharticae Ces., on leaves. Calif.
Sphaerographium niveum Dearn. & House, on branches. N.Y. (1).
Tympanis frangulae Fr., on branches. Calif. (2).

Zizyphus

Z. jujuba Mill., jujube.
Shrub or small tree with edible fruits, cultivated, zone 5 and 7.

Phakopsora zizyphi-vulgaris (P. Henn.) Diet. (II), rust. Southern Fla.

RHIZOPHORACEAE

Rhizophora

R. mangle L., American mangrove
Small tree of the coastal shoals of southern Florida and the West Indies.

Anthostomella rhizomorphae (G. Kunze) Berl. & Vogl., on leaves. P.R.

ROSACEAE

Agrimonia, agrimony

(1) *A. eupatoria* L.
(2) *A. pubescens* Wallr. (*A. mollis* (Torr. & Gray) Britt.)
(3) *A. striata* Michx.
(4) Other species.

Perennial herbs of woodlands and waste ground in the Eastern and Central States and Texas: (1), of Europe, is cultivated as a drug plant; (2,3) are wildlife-food plants.

Cercospora sp., leaf spot. Ill. (1).
Peronospora potentillae d By. (*P. agrimoniae* Syd. ex Gäum.), downy mildew. N.Y., Wis. (1); Iowa, Wis. (2,4); Wis. (3); N.C., Tex. (4).
Phoma herbarum West., stem blight. Tex. (2,4).
Phyllosticta decidua Ell. & Kell., leaf spot. N.C., Wis. (3); Wis., Tex. (2,4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,4).
Puccinia agrimoniae Arth. (?II,III), rust. Mo. (2). O and I unknown.
Pucciniastrum agrimoniae (Schw.) Tranz. (II,III), rust. General on native species (2,3,4) from Maine to Fla., N.Mex., Colo., and N.Dak. O and I unknown.
Septoria agrimoniae Roum., leaf spot. Mo. (1); Iowa, Tex. (2); Wis. (3); Ill., Ind., N.Y., N.C., Tex., Wis. (4).
S. agrimoniae-eupatoriae Bomm. & Rouss.—Iowa (2).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Mass. to N.C., Nebr., and Wis. (1,2,3,4).
Mosaic—unidentified virus. N.Y. (4).

Amelanchier, serviceberry, Juneberry

(1) *A. alnifolia* Nutt., western serviceberry, saskatoon: Range 4,10,11,12,13,14,15,18, 19,21,23,24,26.
(2) *A. canadensis* (L.) Medic., downy serviceberry. Range 20,21,22,23,24,25,26,27,28, 29,30.
(3) *A. cusickii* Fern., Cusick serviceberry. Range 6,7,8,12.
(4) *A. florida* Lindl., western serviceberry. Range 1,2,4,7.
(5) *A. polycarpa* Greene, cluster serviceberry. Range 11,13,14.
(6) *A. sanguinea* (Pursh) DC. (*A. canadensis* var. *rotundifolia* Roem.). Range 22,23,24, 25,26,27,28,29.
(7) *A. spicata* (Lam.) V. Koch (*A. oblongifolia* Roem. × *A. stolonifera* Wieg.). Range 26,27,28.
(8) Other species.

Ornamental trees or shrubs of the temperate Northern Hemisphere, cultivated for their white or pink, racemose flowers.

Apiosporina collinsii (Schw.) Hoehn., witches'-broom, black mildew. Widespread (1); general (2,8); Mont., Wash. (4); N.Mex. (5).
Coccomyces tumidus (Fr.) De N. (*Lophodermium tumidum* Lambotte), leaf spot. Mo., Mont. (1).
Coryneum longistipitatum Berl. & Bres., on branches. Alaska (8).
Cylindrosporium aroniae Sacc., on leaves. Mont. (1).
Daedalea unicolor Bull. ex Fr., wood rot, butt rot. Cosmopolitan (8).
Dermea bicolor (Ell.) Groves, on branches. Mont., N. Dak. (1); N.Dak. (8).
Diaporthe tuberculosa (Ell.) Sacc., on twigs, branches. Mich., N.J., N.Y. (8).
Diplodia amelanchieris Sacc., on branches. Colo. (1).
Erwinia amylovora (Burr.) Winslow et al., fire blight. Mont., Tex. (1); N.J. (2); widespread (8).
Erysiphe polygoni DC., powdery mildew. Idaho, Mont. (1); occasional (8).
?*Eutypella fraxinicola* (Cke. & Pk.) Sacc.—Ga. (2).
Fabraea maculata (Lév.) Atk. (*Entomosporium maculatum* Lév.), leaf blight. Widespread (1,8); Ga., Ill., Ind. (2); Oreg. (4); Iowa (7).
Fusicladium sp., witches'-broom. Wash. (1,3).
Gloeosporium perennans Zeller & Childs, canker. Oreg. (1.)
Gymnosporangium biseptatum Ell., rust. Aecia on (2) and *A. intermedia* Spach in Northeastern and Middle Atlantic States; on *A. wiegandii* Nielsen in Maine. Telia on *Chamaecyparis thyoides* (L.) B.S.P.
G. clavariaeforme (Jacq.) DC., rust. Aecia on leaves, fruits, and stems of (1,4,5) and *A. pumila* Nutt. in Western States; on (2), *A. intermedia*, and *A. oblongifolia* (Torr. & Gray) Roem. in Central and Eastern States and Maine. Telia on *Juniperus communis* L. and var. *saxatilis* Pall. (*J. sibirica* Burgsd.)
G. clavipes Cke. & Pk., rust. Aecia on fruits and stems of (1) in Mont. and Wyo.; on (2,6) and *A. humilis* Wieg., *A. intermedia*, and *A. oblongifolia* in Central and Eastern States and Maine. Telia on *Juniperus communis* and var. *saxatilis* (*J. sibirica*) and *J. virginiana* L.
G. corniculans Kern, rust. Aecia on leaves of (2,6), *A. intermedia*, and *A. oblongifolia* in the Central and Eastern States and Maine. Telia on *Juniperus* spp.
G. cupressi Long & Goodding, rust. O and I on *A. mormonica* Schneid.; III on *Cupressus arizonica* Greene in Ariz.
G. harknessianum (Ell. & Ev.) Kern, rust. Aecia on fruits of (1) in Calif. and Oreg. Telia on *Juniperus occidentalis* Hook.
G. inconspicuum Kern, rust. Aecia on fruits of (1), *A. bakeri* Greene, *A. oreophila* A. Nels., *A. prunifolia* Greene, and *A. utahensis* Koehne in Ariz., Colo., N.Mex., and Utah. Telia on *Juniperus utahensis* (Engelm.) Lemmon.
G. juvenescens Kern, rust. Aecia on leaves of (1,4,5), *A. bakeri*, *A. mormonica*, and *A. pumila* in Western States; on (2) and *A. humilis* in Wis. and Ill.; on *A. elliptica* A. Nels. in Wyo. Telia on *Juniperus* spp. =*G. nidus-avis* Thaxt., q.v., according to Prince.
G. kernianum Bethel, rust. Aecia on leaves of (1) and *A. oreophila* in Ariz., Colo., and Oreg. Telia on *Juniperus* spp.
G. libocedri (P.Henn.) Kern, rust. Aecia on leaves and

fruits of (1,4) in Calif. and Oreg. Telia on *Libocedrus decurrens* Torr.

Gymnosporangium nelsoni Arth., rust. Aecia on leaves and fruits of (1,4,5), *A. bakeri, A. mormonica, A. pumila,* and others in Mont. to Ariz and New Mex. (northern and southern Rocky Mt. States). Telia on *Juniperus* spp.

G. nidus-avis Thaxt., rust. Aecia on leaves, fruits, and stems of (2), *A. intermedia, A. laevis* Wieg., and *A. oblongifolia* in the Central and Eastern States and Maine; on *A. stolonifera* Wieg. and *A. wiegandii* in Maine. Telia on *Juniperus virginiana.*

Massaria conspurcata (Wallr.) Sacc., on dead branches. N.Y. (2).

Monilinia amelanchieris (Reade) Honey, fruit rot. N.Y. (2,8).

M. fructicola (Wint.) Honey, brown rot. Mich., Ohio (8).

M. gregaria (Dana) Honey, leaf and fruit blight. Colo. (1); Wash. (3,8); Iowa (8).

Mycosphaerella maculiformis (Pers. ex Fr.) Schroet., on fallen leaves. N.Y. (2).

M. punctiformis (Pers. ex Fr.) Schroet.—Ga. (2).

Nectria cinnabarina Tode ex Fr., dieback, canker. Ga. (2), occasional (8).

N. galligena Bres.—on *A. laevis* in N.Y.

Nummularia discincola (Schw. ex Fr.) Cke.—Ga. (2).

N. discreta (Schw.) Tul., blister canker. Iowa, Kans., Mass., Ohio (2).

Pezicula pruinosa Farl. (*Sphaeronema pruinosum* Pk.), on branches. Widespread (8).

Phyllactinia guttata (Fr.) Lév. (*P. corylea* (Pers.) Karst.), powdery mildew. Oreg., Wash. (8).

Phyllosticta innumerabilis Pk., leaf spot. Iowa, N.Dak., Nebr. (1); Minn. (6).

P. paupercula Pk., leaf spot. Kans., Mont. (1).

P. virginiana (Ell. & Halst.) Seaver, leaf spot. N.Y., Pa., Wis. (2).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).

Podosphaera oxyacanthae (DC.) d By., powdery mildew. Occasional (8).

Sphaeronema pruinosum Pk.: See *Pezicula pruinosa.*

Sphaeropsis amelanchieris Dearn. (*Haplosporella amelanchieris* (Dearn.) Petr. & Syd.), on branches. N.Y. (2).

Taphrina amelanchieri Mix, witches'-broom. Calif. (1).

Thelephora albido-brunnea Schw., on stems and crowns of young trees. N.C. (2,8).

Valsa ceratophora Tul.—Ga. (2).

Valsella laschii (Nits.) Sacc.—Ga. (2).

Amygdalus

See *Prunus amygdalus* Batsch, *P. davidiana* (Carr.) Franch., *P. persica* (L.) Batsch and var. *nectarina* (Ait.) Maxim., and *P. tenella* Batsch., pp. 394 to 396.

Aronia, chokeberry

(1) *A. arbutifolia* (L.) Ell., red chokeberry, including var. *atropurpurea* Robins (*A. floribunda* Spach), purple chokeberry. Range 22,23,25,27,28,29,30.

(2) *A. melanocarpa* (Michx.) Ell., black chokeberry. Range 22,23,24,25,26,27,28,29.

Small shrubs of swamps and low-lying woods of eastern North America, planted for ornament.

Ascochyta pirina J.J.Davis, leaf and fruit spot. Wis. (1).

Cercospora mali Ell. & Ev., leaf spot. Ala., Tex. (1).

C. pyri Farl., leaf spot. Mich., Wis. (1,2); N.H. (1).

Cercosporella pyrina Ell. & Ev., on leaves. Mich. (2).

Circinostoma pulchellum S.F.Gray, on branches. N.Y. (1).

Cuscuta compacta Juss., dodder. Fla. (1).

Erwinia amylovora (Burr.) Winslow et al., fire blight. Mich., Tex., W.Va. (1).

Gymnosporangium clavariaeforme (Jacq.) DC. (O and I), rust. Mass. (1). III on *Juniperus* spp.

G. clavipes Cke. & Pk. (O and I), rust. Maine, Mass., Tex. (1); Conn., Maine (2). III on *Juniperus* spp.

G. davisii Kern (O and I), rust. Maine (1,2); Mich., N.H., Wis. (2). III on *Juniperus communis* L. var. *depressa* Pursh.

G. fraternum Kern (O and I), rust. Maine (1,2); Del., Mass., N.J., Pa. (1). III on *Chamaecyparis thyoides* (L.) B.S.P.

Monilinia ?fructicola (Wint.) Honey, brown rot. Wis. (2). Reported as *Monilinia cinerea* Bon.

Mycosphaerella arbutifoliae (Pk.) House, leaf spot. Ga. (1), N.Y. (1,2).

Phyllosticta arbutifolia Ell. & G. Martin, leaf spot. N.J. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).

Physalospora obtusa (Schw.) Cke.—Ga. (1).

Sclerotinia sp., on young shoots. N.Y. (1).

Aruncus

A. sylvester Kostel., goatsbeard.

Tall perennial herb of woodlands, mostly at high altitudes in the East and the Pacific Northwest; sometimes grown for ornament.

Cercospora sp., leaf spot. Oreg.

Leptosphaeria arunci Zeller, on stems. Oreg.

Ramularia ulmariae Cke., leaf spot. Alaska.

Cercocarpus

(1) *C. betuloides* Nutt., birchleaf mountain-mahogany. Range 4,5,9,11.

(2) *C. montanus* Raf., mountain-mahogany. Range 9,11,12,13,14,15,16.

(3) Other species.

Evergreen or half-evergreen shrubs or small trees of western North America.

Diatrype standleyi Fairm., on dead branches. N.Mex. (2).

Dothidea cercocarpi Ell. & Ev., on leaves. Calif. (3).

Gloeosporium cercocarpi Ell. & Ev., on leaves. Calif. (1).

Leptosphaeria cercocarpi Syd., on leaves. Utah. (3).

Schizostoma cercocarpi Tr. & Earle, on twigs. Colo. (3).

Septogloeum cercocarpi Bonar, leaf spot. Calif. (1).

Sphaceloma cercocarpi Bitan. & Jenkins, anthracnose. Calif. (on *C. betuloides* var. *multiflorus* Jepson).

Stereum hirsutum Willd. ex Fr., wood rot. Oreg. (3).

Teichospora cercocarpi (Earle) Fairm., on dead branches. Colo., N.Mex. (2).

Chaenomeles, flowering quince

(1) *C. japonica* (Thunb.) Lindl. (*Cydonia maulei* T.Moore), dwarf Japanese flowering quince, and *C. lagenaria* (Loisel.) Koidz. (*Cydonia japonica* Pers.), Japanese flowering quince.

(2) *C. sinensis* (Thouin) Koehne (*Cydonia sinensis* Thouin), Chinese quince.

Ornamental hardwooded shrubs of China (*C.*

lagenaria and (2)) and of Japan (*C. japonica*): (1) widely cultivated in the intermediate and hardy zones of the United States; (2) occasionally cultivated for fruit and as an ornamental.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Occasional (1).
Botryosphaeria ribis Gross. & Dug., Dothiorella twig blight. Tex. (1).
Cercospora cydoniae Ell. & Ev., leaf spot. Ala., Ga. (1).
Coryneum cydoniae Dearn. & House, on branches. N.Y. (1).
Entomosporium maculatum Lév.: See *Fabraea maculata.*
Erwinia amylovora (Burr.) Winslow et al., fire blight. Occasional, Tex. (1); N.Y. (2).
Fabraea maculata Atk., leaf blight. Ala., Conn., N.Y.
Gymnosporangium clavipes Cke. & Pk. (O,I), "quince" rust, on stems. Conn., N.J. (1). III on *Juniperus* spp.
G. libocedri (P.Henn.) Kern. (O,I), rust, on leaves. Oreg. (1). III on *Libocedrus decurrens* Torr.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Tex. (1).
Monilinia fructicola (Wint.) Honey, brown rot, leaf blight. Mich. (1).
M. laxa (Aderh. & Ruehl.) Honey, brown rot, twig blight, blossom blight. Calif. (1).
Mycosphaerella pomi (Pass.) Lindau, fruit spot. Md. (2).
Nectria cinnabarina Tode ex Fr. (*Tubercularia vulgaris* Tode), on branches. Calif. (1).
Phoma sp., canker, twig blight. Md., Tex. (1).
Phyllosticta sp., on leaves. Mo., Nebr. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora obtusa (Schw.) Cke., canker, twig blight. Eastern States, Tex. (1).
Septobasidium burtii Lloyd, felt fungus. Miss. (1).
S. mariani Bres.—N.C. (1).

Chrysobalanus

C. icaco L., cocoplum.

Evergreen tree of tropical America, including southern Florida, occasionally cultivated as an ornamental.

Asterina schroeteri (Rehm) Th., on leaves. P.R.
Cephaleuros virescens Kunze, algal spot. Fla.
Cercospora chrysobalani Ell. & Ev., leaf spot. Fla., P.R. Conidial stage of *Mycosphaerella ?chrysobalani*, q. v.
Leprieurina radiata Toro, on leaves. P.R.
Mycosphaerella chrysobalani Miles, leaf spot. P.R.
Pestalotia funerea Desm., on leaves. P.R.

Cotoneaster

Cotoneaster spp.

Ornamental shrubs of temperate parts of Europe and Asia, widely cultivated in zones of intermediate hardiness throughout the United States.

Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Central States.
Armillaria mellea Vahl ex Fr., root rot. Calif.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Diplodia sp., twig blight. Tex.
Fabraea maculata Atk. (*Entomosporium maculatum* Lév.), leaf spot. Calif., Iowa.
Gibberella baccata (Wallr.) Sacc. (*Fusarium lateritium* Nees), on twigs. Calif.
Nectria cinnabarina Tode ex Fr. (*Tubercularia vulgaris* Tode), on twigs. Conn.
Phyllosticta cotoneastri Allesch., leaf spot. Md.
P. cydoniae (Desm.) Sacc.—Miss.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Physalospora obtusa (Schw.) Cke., canker, twig blight. N.Y. to Ohio and Tex.
Phytophthora sp., collar rot. Calif.
Podosphaera sp., powdery mildew. Calif.
Venturia sp., scab. Wash.

Cowania

Cowania spp.

Small, handsome-flowered shrubs. Range 9, 10,11,13,14,17.

Phragmidium andersoni Shear (I,II,III), rust. Idaho.

Crataegus, hawthorn

Crataegus spp.

Hardwooded shrubs and small trees occurring in great diversity throughout the United States; some of the native species are cultivated, but the most important horticultural forms belong to *C. monogyna* Jacq. and *C. oxyacantha* L., the English hawthorns. See also *Pyracantha* (*C. pyracantha* Bork. =*Pyracantha coccinea* Roem.; *C. lalandii* Hort. =*P. coccinea* var. *lalandii* Dipp.).

Armillaria mellea Vahl ex Fr., root rot. Okla.
Botryosphaeria melathroa Berk. & Curt. and (=?) *B. ribis* Gross. & Dug., on dead branches. Md., Pa.
Botrytis cinerea Pers. ex Fr., fruit rot. Mass.
Cenangium crataegi Schw., on branches. Pa.
Cercospora apiifoliae Tharp, leaf spot. Tex.
C. confluens Lieneman (*C. crataegi* Heald & Wolf)—Tex.
Cercosporella mirabilis Pk., leaf spot. Colo., N.Y., Wis.
Cladosporium sp. (*?C. carpophilum* Thuem.), on fruit. Iowa.
Cornularia harpographoides Dearn., on branches. Mich.
Cucurbitaria crataegi (Schw.) Ell. & Ev., on branches. Mich., N.Dak., Pa. (*C. crataegi* Niessl has priority).
Cylindrosporium brevispina Dearn., leaf spot. Calif. to Mont. and Wash.
C. crataegi Ell. & Ev.—W.Va.
Cytospora microspora (Cda.) Rab., on twigs. Mich., N.J.
Daedalea confragosa Bolt. ex Fr., wood rot. Cosmopolitan.
Dermatea crataegicola Durand, on dead branches. Ga., Iowa.
Entomosporium maculatum Lév. and *E. thuemenii* (Cke.) Sacc.: See *Fabraea maculata.*
Erwinia amylovora (Burr.) Winslow et al., fire blight. Widespread, especially on English hawthorns.
Fabraea maculata Atk., leaf blight. Eastern and Central States southward.
Fomes spp., wood rot. Species reported include: *F. conchatus* Pers. ex Gill.—Mich., N.Dak.; *F. langloisii* (Murr.) Sacc. & D. Sacc.—La.; *F. pini* (Thore ex Fr.) Karst.—Colo., Mont.
F. applanatus (Pers. ex Fr.) Gill., white heart rot, butt rot. Calif., Mich.
F. pomaceus Pers. ex Lloyd f. *crataegi* Baxter, white pocket rot. Mich.
Fusicladium dendriticum (Wallr.) Fckl.: See *Venturia inaequalis.*
Gloeodes pomigena (Schw.) Colby, on twigs. Ind.

Gloeosporium crataegi Dearn. & Barth., leaf spot. Wash. (*G. crataegi* Hollos has priority).
Glomerella cingulata (Ston.) Spauld. & Schrenk, on fruit. Md.
Gymnosporangium betheli Kern (O,I), rust, on fruits. N.Dak to Wash., Colo., and N. Mex. III on *Juniperus* spp.
G. clavipes Cke. & Pk. (O,I), quince rust, on fruits and stems. General east of the Rocky Mountains. III on *Juniperus* spp., especially *J. communis* L. and *J. virginiana* L.
G. exiguum Kern (O,I), rust, on leaves and fruits. Tex. III on *Juniperus* spp.
G. floriforme Thaxt. (O,I), rust, on leaves. S.C. to Fla., Okla., and Tex. III on *Juniperus virginiana.*
G. globosum Farl. (O,I), hawthorn rust, on leaves. Maine to N.Dak., Fla., Ga., and Tex. III on *Juniperus* spp., especially *J. virginiana.*
G. hyalinum (Cke.) Kern. (O,I), rust, on leaves. Atlantic coast (N.C. to Fla.). III unknown.
G. juniperi-virginianae Schw., rust. Listed on *Crataegus* sp. and *C. mollis* (Torr. & Gray) Scheele in Iowa; not listed on *Crataegus* in Arthur.
G. libocedri (P.Henn.) Kern (O,I), rust, on leaves and fruit. Pacific coast (Oreg. and Calif.) III on *Libocedrus decurrens* Torr.
G. nelsoni Arth. (O,I), rust, on leaves and fruits. Wyo. III on *Juniperus* spp.
G. trachysorum Kern (O,I), rust, on leaves. Atlantic and gulf coasts. Pa. to Fla., La., and Tex. (III) on *Juniperus virginiana.*
G. tubulatum Kern, (O,I), rust, on leaves. Northern Rocky Mountains to Oreg. and Wash.
Hendersonia crataegi Brenckle—N.Dak.
H. crataegicola Atk., leaf spot. Ala., Tex.
H. foliorum Fckl.—Tex.
Hirudinaria macrocarpa Ces., on leaves. Ill., S.C.
Hydnum setosum Pers. (*schiedermayeri* Heufl.). = *Mycoacia setosa* (Pers.) Donk., on dead trunks. Central and eastern U.S.
Hypoxylon rubiginosum Pers. ex Fr.—Ga.
H. rumpens (Cke.) J.H.Miller—Ga.
Lecanidion clavisporum (Berk. & Br.) Sacc.—Ga.
Monilinia johnsoni (Ell. & Ev.) Honey, leaf blight and fruit rot. N.Y. to Minn. and Iowa.
Monochaetia crataegi (Ell. & Ev.) Sacc. & D.Sacc., leaf spot. Fla. (On *C. uniflora* Muenchh. and *C. watsonii* Murr.).
Mycosphaerella sp., leaf spot. Ga.
Myriangium asterinosporum (Ell. & Ev.) J. H. Miller, on scale insects infesting branches. Eastern States to Ga.
Otthia crataegi Fckl., on branches. N.Dak.
Phleospora crataegi J.J.Davis and *P. oxyacanthae* Ell. ex Davis non (O.Kunze & Schm.) Wallr.: SEE *Cercosporella mirabilis.*
Phoma leprosa Pk., on fruit. N.Y.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Tex.
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. General.
Phyllosticta spp., leaf spots. Widespread. Species reported include: *P. crataegi* (Cke.) Sacc.—N.Y. to N.Dak., S.C., and N.Mex.; *P. crataegicola* Sacc.—Colo., N.Dak.; *P. grisea* Pk.—N.Y.; *P. rubra* Pk.—N.Y. to W.Va. and Kans.; and *P. solitaria* Ell. & Ev.—Ill., N.J.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. Eastern and Central States, Ga., Iowa.
?Pleosphaeria echinata (Ell. & Ev.) J.H.Miller—Ga.
Podosphaera oxyacanthae (DC.) d By., powdery mildew. Eastern and Central States southward.
Polyporus gilvus Schw. ex Fr., wood rot. Lower Mississippi Valley.
P. versicolor L. ex Fr., wood rot, sometimes on living trees. Cosmopolitan.
Sclerotium rolfsii Sacc., seedling blight. Fla.
Septobasidium spp., especially *S. curtisii* (Berk. & Desm.) Boed. & Steinm., *S. mariani* Bres., and *S. pseudopedicellatum* Burt, felt fungus. Southeastern and Gulf States.
S. castaneum Burt—Fla.
Septoria crataegi Kickx, leaf spot. Mich. to N.Dak., Okla.
Sphaeronema longirostris Clements, on branches. Nebr.
Sphaeropsis foliicola Berl. & Roum., on leaves. N.Y.
Sporodesmium quadratum Atk., on leaves. Ala.
Stemphylium crataegi (Ell. & Ev.) Hoehn., on leaves. N.J.
Stigmella crataegi Ell. & Ev.—S.C.
Valsa ambiens Pers. ex Fr., on twigs. Widespread.
Venturia crataegi Aderh.—Fla.
V. inaequalis (Cke.) Wint. apud Thuem., scab. Widespread.
Xylaria digitata (L. ex Fr.) Grev., grayish-white root and collar rot, ?saprophytic.
X. hypoxylon L. ex Grev., root rot. Ind., Ohio.

Cydonia

C. oblonga Mill., quince.

A small tree of western Asia, with fragrant, pyriform fruit; cultivated throughout the United States in zones of intermediate hardiness.

Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Md. to N.C., Pacific Coast States. Burr knots, said to be nonparasitic, have been reported in Miss., Oreg., and Wash.
A. tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Widespread.
Alternaria mali Roberts, fruit rot. Ind.
Botryosphaeria ribis Gross. & Dug., Dothiorella twig blight. Tex.
Botrytis cinerea Pers. ex Fr., gray-mold rot of fruit. Occasional.
Cephalothecium roseum Cda., pink-mold rot of fruit. Occasional.
Coniothyrium pyrina (Sacc.) Sheldon, on leaves. W.Va.
Cylindrosporium pomi (Pass.) C. Brooks: SEE *Mycosphaerella pomi.*
Elsinoë piri (Woron.) Jenkins (*Sphaceloma pirinum* (Pegl.) Jenkins), anthracnose. Wash.
Entomosporium maculatum Lév.: SEE *Fabraea maculata.*
Erwinia amylovora (Burr.) Winslow et al., fire blight. General.
Exosporium sp.—Ga.
Fabraea maculata Atk., leaf blight, black spot of fruit. General.
Fusicladium pirinum (Lib.) Fckl.: SEE *Venturia pirina.*
Gloeosporium fructigenum Berk. and *G. rufomaculans* (Berk.) Thuem.: SEE *Glomerella cingulata.*
G. perennans Zeller & Childs: SEE *Neofabraea perennans.*
Glomerella cingulata (Ston.) Spauld. & Schrenk, bitter rot, canker. Eastern and Central States, Tex.
Gymnosporangium clavariaeforme (Jacq.) DC. (O,I), rust, on leaves, fruits, and stems. Conn., Maine, N.H. III on *Juniperus* spp.
G. clavipes Cke. & Pk. (O,I), orange rust, "quince" rust on fruits and stems. Eastern and Central States to Ala. and Tex. III on *Juniperus* spp.
G. libocedri (P. Henn.) Kern (O,I), rust, on fruits and stems. Oreg. III on *Libocedrus decurrens* Torr.
G. nelsoni Arth. (O,I), rust, on leaves and stems. Ariz., Colo. III on *Juniperus* spp.

G. nidus-avis Thaxt. (O,I), rust, on leaves, fruits, and stems. Conn., N.Y. III on *Juniperus virginiana* L.
Hendersonia cydoniae Cke. & Ell., on leaves. Conn., N.J.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Leptothyrium pomi (Mont. & Fr.) Sacc., fruit spot. Mo.
Meloidogyne sp., root knot nematodes. Tex.
Monilinia fructicola (Wint.) Rehm, brown rot (fruit). Eastern States, Miss., Oreg., Tex.
M. laxa (Aderh. & Ruhl.) Honey, brown rot, twig blight. Pacific Coast States.
Mycosphaerella pomi (Pass.) Lindau, fruit spot. New England to Ohio.
Nectria cinnabarina Tode ex Fr., on branches. N.H., Wash.
N. galligena Bres., trunk canker. Oreg.
Neofabraea malicorticis (Cordley) Jacks., Northwestern anthracnose of fruit. Oreg., Wash.
N. perennans (Zeller & Childs) Kienh., perennial canker. Oreg.
Pellicularia koleroga Cke. *(Corticium stevensii* Burt), thread blight, on leaves. N.C., Gulf States.
Penicillium expansum L. ex Thom, blue-mold rot. Cosmopolitan.
Phoma cydoniae Sacc. & Schulz., pale rot of fruit. Ill., Mich.
P. mali Schulz. & Sacc., fruit rot. Ind.
P. pomi Pass.: SEE *Mycosphaerella pomi.*
Phyllactinia guttata (Fr.) Lév. *(P. corylea* Pers. ex Karst.), powdery mildew. Va.
Phyllosticta sp., leaf spot. Del.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke. *(P. cydoniae* Arn.), black rot of fruit, canker, leaf spot. Eastern and Central States to Ala. and Tex.
Podosphaera leucotricha (Ell. & Ev.) Salm., powdery mildew. Calif., Wash.
P. oxyacanthae (DC.) d By.—N.Y. and W.Va. to Ind.
Sphaceloma pirinum (Pegl.) Jenkins: SEE *Elsinoë piri.*
Sphaeropsis cydoniae Cke. & Ell.: SEE *Physalospora obtusa.*
Valsa leucostoma Pers. ex Fr., canker, twig blight.
Venturia pirina Aderh., scab. Conn.

Dalibarda

D. repens L., dewdrop, robin-run-away.

Low perennial of woodlands in the Eastern and North Central States, sometimes grown in rock gardens.

Phyllachora dalibardae (Pk.) Sacc., on leaves, N.Y.
Septoria dalibardae Pk., leaf spot. Maine, Mich., N.H., N.Y., Vt.

Dryas

Dryas spp.

Low evergreen shrubs of high altitudes in Canada and the Pacific Northwest; wildlife-food plants; also grown in rock gardens.

Massarina dryadis Rostr., on leaves. Alaska.
Mycosphaerella ootheca (Sacc.) Magn., on leaves. Alaska.

Duchesnea

D. indica (Andr.) Focke, mock-strawberry, Indian strawberry.

Trailing perennial of India, naturalized in waste ground in the Eastern and Southern States; sometimes used for ornament or ground cover; furnishes food for wildlife.

Frommea obtusa (Strauss) Arth. var. *duchesneae* Arth. (O,I,II,III), rust. N.H. to Fla. and Ky.
Peronospora potentillae d By., downy mildew. N.C.
Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot. Va.
Synchytrium globosum Schroet., leaf gall. S.C.

Eriobotrya

E. japonica (Thunb.) Lindl., loquat.

Evergreen tree of China, cultivated for fruit and as an ornamental in zone 7 and southward.

Armillaria mellea Vahl ex Fr., mushroom root rot. Calif.
Cephaleuros virescens Kunze, algal spot. Fla., P.R.
Clitocybe tabescens (Scop. ex Fr.) Bres., mushroom root rot. Fla.
Colletotrichum gloeosporioides Penz., anthracnose, flower blight, withertip. ?Calif., Fla., Tex. Conidial stage of *Glomerella cingulata,* q. v. Not reported by Condit in Calif. Agr. Expt. Sta. Bul. 250.
Entomosporium maculatum Lév., leaf blotch. Fla. Conidial stage of *Fabraea maculata* Atk.
Erwinia amylovora (Burr.) Winslow et al., fire blight. Gulf States, Ariz., Calif.
Fusicladium eriobotryae (Cav.) Sacc., scab on leaves, stems, and fruit. Widespread. Said to be morphologically different from *Fusicladium* on apple and pear.
Glomerella cingulata (Ston.) Spauld. & Schrenk, on twigs and fruit. Gulf States.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla.
Pestalotia longiaristata Maubl. and *Pestalotia* sp., on leaves. Fla., La.
Phyllosticta eriobotryae Thuem., leaf spot. Fla.
Physalospora obtusa (Schw.) Cke., on branches. Fla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Phytophthora cactorum (Leb. & Cohn) Schroet., collar rot. Calif.

Filipendula, meadowsweet

(1) *F. purpurea* Maxim.
(2) *F. rubra* (Hill) Robinson, queen-of-the-prairie.
(3) *F. ulmaria* (L.) Maxim., queen-of-the-meadow.

Tall, hardy, perennial herbs of meadows and prairies, grown for ornament; (1), of Japan, is cultivated; (2) ranges from Pennsylvania to Georgia and Iowa; (3), of Europe, is escaped from gardens in the Northeastern States.

Cylindrosporium sp., leaf spot. Conn. (1,3).
Septoria ulmariae Oud., leaf spot. Conn. (3), Wis. (species not designated).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Ind., N.Y. (2); Vt. (2,3).
Triphragmium ulmariae (Hedw. f.) Lk. (O,I,II,III), rust. Ind. (2).

Fragaria, strawberry

I. Cultivated Species

Fragaria chiloensis Duchesne var. *ananassa* Bailey, strawberry.

Low perennial herb, grown throughout the United States in gardens, the sweet "berry" familiar to all. Modern cultivated varieties are

complex hybrids derived from *F. vesca* L., European or Alpine strawberry, woodland strawberry, and *F. virginiana* Duchesne, Virginia strawberry. The principal commercial-producing areas are in Louisiana, Arkansas, Tennessee, Oregon, Michigan, and generally from Maryland to North Carolina and Missouri, also the Pacific coast.

Alternaria sp., associated with black-root and root rot. Utah.

Aphelenchoides besseyi Christie, summer dwarf, "crimp." Chiefly in the Southeastern and Gulf States, reported also from Ark., Calif., Del., Ill.

A. fragariae (Ritz.-Bos) Christie, spring dwarf (redplant, ?"cauliflower," in Europe). Mass. to Fla. and Tex.; also Ark., Calif., Mich., Tenn., Wash.

Armillaria mellea Vahl ex Fr., mushroom root rot. Calif., Oreg., Wash.

Ascochyta colorata Pk. and *A. fragariae* Sacc.: SEE *Diplocarpon earliana.*

Botrytis cinerea Pers. ex Fr., Botrytis blight, gray-mold rot of fruit. General.

Cercospora sp., leaf spot. La.

Cladosporium herbarum Lk. ex Fr., associated with black root. Oreg. Cosmopolitan as secondary leaf and fruit mold.

Colletotrichum fragariae A. N. Brooks, anthracnose on petioles and stolons. Fla.

Coniothyrium spp., in part *C. fuckelii* Sacc., associated with black root. Mich., N.C., Okla., Utah. SEE ALSO *Leptosphaeria coniothyrium.*

Cylindrocladium scoparium Morg., root rot. Tenn.

Dendrophoma obscurans (Ell. & Ev.) H. W. Anderson, leaf blight, angular leaf spot. Mass. to Fla., Tex., and Nebr.; also Mich., Minn., Oreg.; stem-end rot of fruit in Mich.=*Gnomonia* sp. according to Alexopoulos and Cation (Mich.).

Diachea leucopodia (Bull.) Rost., slime mold on stolons and foliage. Calif., Ill., Kans., La., Miss., Mo., Tenn., Tex.

Diplocarpon earliana (Ell. & Ev.) Wolf, leaf scorch. General.

Diplodia sp., root rot (?secondary). Fla.

Ditylenchus dipsaci (Kuehn) Filip., leaf and stem nematode. Calif., Idaho, N.C., Oreg., ?Tex., Wash.

Erwinia carotovora (L.R.Jones) Holland, soft rot. Mass.

Fuligo septica (L.) Weber, slime mold on stolons and foliage. Iowa, Kans., Minn., Nebr., N.J., Tex., Wash.

F. violacea Pers.—Tex.

Fusarium spp., associated with black root and root rot but pathogenicity unproved. Reported in most strawberry districts—Southeastern, Eastern, and Central States, and the Pacific Northwest. Specific identification usually lacking, but *F. orthoceras* Appel & Wr. and *F. orthoceras* var. *longius* (Sherb.) Wr. (=*F. oxysporum* Schlecht. em. Snyd. & Hans.) have been reported in Md. and Utah; *F. solani* (Mart.) Appel & Wr. in Utah.

Gloeosporium sp. (?*G. fragariae* (Lib.) Mont.), leaf spot. Ill., Mass., Pa. Associated with black root in Mich., N.C., Utah. *G. fragariae* is generally considered a synonym of *Diplocarpon earliana.*

Gnomonia fragariae Kleb., on dead leaves. N.J.

Hainesia lythri (Desm.) Hoehn.: SEE *Pezizella oenotherae.*

Heterodera marioni (Cornu) Goodey (=*Meloidogyne* spp.)

Leptosphaeria coniothyrium (Fckl.) Sacc., associated with black root. Oreg. SEE ALSO *Coniothyrium.*

Marssonina fragariae (Sacc.) Kleb.: SEE *Diplocarpon earliana.*

Microascus intermedius Emmons & B. O. Dodge, on diseased roots. N.C.

Mucilago spongiosa (Leyss.) Morg., slime mold on stolons and foliage. Kans., Minn., Mo., Nebr., Okla.

Mycosphaerella fragariae (Tul.) Lindau, common leaf spot, black-seed disease. General.

M. louisianae Plakidas, purple leaf spot. La., Miss., N.C. Perhaps identical with *Sphaerella earliana* Wint.

Neotylenchus abulbosus Steiner, in buds. Calif.

Olpidium brassicae (Wor.) Dang., associated with black root. Utah, ?Oreg.

Orobanche sp., broom-rape, parasitic on roots. Wash.

Patellina fragariae F. L. Stevens & Peterson: SEE *Pezizella oenotherae.*

Penicillium spp., secondary fruit rot, sometimes associated with black root. Idaho, Oreg., N.Y., Utah, Wash.

Peronospora fragariae Roze & Cornu, downy mildew. Iowa.

Pezizella oenotherae (Cke. & Ell.) Sacc. (=*Discohainesia oenotherae* (Cke. & Ell.) Nannf.), tan rot of fruit, secondary rot of leaves and stolons. Chiefly in the South from Md. to Fla. and Okla., also Ill., Iowa, Maine, Ohio, Oreg., Wis., Alaska. Associated with black root or root rot in Mich., Okla., Oreg., Tenn.

Phoma spp., in part *Dendrophoma obscurans,* q. v., on leaves, stolons, and roots. Conn., Fla., Idaho, Ill., Ind., Iowa, N.C., N.J., Ohio.

Phyllosticta fragaricola Desm. & Rob., on leaves. Conn., Fla., Ind., Iowa, N.C., N.J. Perhaps a stage of *Mycosphaerella fragariae.*

P. obscurans (Ell. & Ev.) Tassi: SEE *Dendrophoma obscurans.*

Physarum cinereum (Batsch) Pers., slime mold on foliage and stolons. Ill., Nebr., N.J.

Phytophthora cactorum (Leb. & Cohn) Schroet., leather rot of fruit. Especially in the southern Mississippi Valley and Gulf States; also Ariz., Md., Mich., Okla., Va.

P. fragariae Hickman, red stele, brown-core root rot. Maine to Va., Okla., and Iowa; also Colo., Mich., Wis., and the Pacific States.

Pratylenchus pratensis (De Man) Filip., root nematode. Tenn.

Pythium spp., root rot, ?black root. Fla., Idaho, La., N.J., Oreg., Tenn., Utah, Wash.; lilac soft rot of fruit in Tenn.

P. ultimum Trow, root rot. Calif.

Ramularia spp., in part probably *Cylindrocarpon radicicola* (McAlp.) Wr., root rot, ?black root. Idaho, Oreg., Wash.

R. fragariae Pk. and *R. tulasnei* Sacc.: SEE *Mycosphaerella fragariae.*

Rhabdospora fragariae Atk., on old leaves. Md., N.Y. Perhaps identical with *Septoria aciculosa,* q. v.

Rhizoctonia solani Kuehn, root rot, ?black root. Widespread, especially in the Pacific Northwest and northern strawberry districts; occasional southward, as in Ariz., Fla., Tex. Also causes hard brown rot of fruit, general in the South, and bud rot during winter and early spring from Md. to Fla., La., and Ind. A warm-weather crown rot, attributed to *Rhizoctonia* sp., not *R. solani,* is reported in Fla.

Rhizopus spp., chiefly *R. stolonifer* (Ehr. ex Fr.) Lind, black rot, soft rot, leak, of fruit. Cosmopolitan.

Sclerotinia sclerotiorum (Lib.) d By., crown rot. Md. to Fla., Tex., and Ill.: Calif., Iowa, Minn.

Sclerotiopsis concava (Desm.) Shear & Dodge: SEE *Pezizella oenotherae.*

Sclerotium rolfsii Sacc., southern blight. Ala., Fla., N.C., Tex.

Scorias spongiosa (Schw.) Fr., sooty mold on leaves. Maine.

Septoria aciculosa Ell. & Ev., on old leaves. Ill., Md., N.Y., Va., W.Va. SEE ALSO *Rhabdospora fragariae*.
Sphaeronemella fragariae F. L. Stevens & Peterson, on berries affected with tan rot. Fla., Ill., La., Tex.
Sphaeropsis sp., fruit rot. Colo., Ill.
Sphaerotheca humuli (DC.) Burr., powdery mildew. General in middle and northern districts, including the Pacific States; rare in the South but reported from Ala., Ark., Okla., Tex.
S. humuli var. *fuliginea* (Schlecht.) Salm.—Wash.
Stemphylium sp. (?*S. botryosum* Wallr.), associated with black root. Oreg.
Synchytrium fragariae Zeller & L. Campbell, root gall. ?Calif., Wash.
Verticillium albo-atrum Reinke & Berth., wilt. Calif., N.Y., Oreg., ?Wash.
Verticillium sp., associated with black root, is reported from Idaho.

CRINKLE—virus (*Marmor fragariae* Holmes, Fragaria virus 2 K.M.Sm.). Calif., Idaho, Oreg., Wash.; also reported but not confirmed in N.Y. and Okla.
LEAF ROLL—unidentified virus. Md., N.J., N.Y., Vt.
STUNT—virus (*Nanus cupuliformans* Zeller & Weaver, Fragaria virus 5 Zeller & Weaver). Idaho, Oreg.
WITCHES'-BROOM—virus (*Nanus fragariae* Holmes, Fragaria virus 3 K.M.Sm.). Idaho, Mont., Oreg., Wash; reported also in Minn. and N.J. but not confirmed.
YELLOW-EDGE, XANTHOSIS—virus (*Marmor marginans* Holmes, Fragaria virus 1 K.M.Sm.). Calif., Oreg., Wash.; perhaps also in the Northeastern and Middle Atlantic States when introduced from the Western States.

BLACK ROOT—cause uncertain; in part parasitic (see *Pythium, Ramularia, Rhizoctonia*); in part environmental and physiological, attributed to winter injury, desiccation of roots during planting or digging, defective drainage and deficient soil aeration, and ?presence of toxic materials in the soil. Widespread, especially in the middle and northern strawberry districts; also Ala., Ariz., Fla., Colo., Tex.
BROWN ROOT ROT—action of weakly parasitic fungi in combination with adverse soil conditions.
"CATFACE"—fruit deformity attributed to insects (*Lygus* spp.) or mites (*Tarsonemus* spp.). Idaho, N.Y.
CHLOROSIS—iron deficiency. Minn.
DWARF (crimp)—SEE *Aphelenchoides besseyi* and *A. fragariae*.
LEAL VARIEGATION (Blakemore yellows, June yellows, gold disease, "mosaic" of some early reports)—chlorophyll deficiency occurring especially in Blakemore, Progressive, and related varieties. General.

II. Native Species

(1) *Fragaria bracteata* Heller
(2) *F. chiloense* Duchesne
(3) *F. vesca* L. var. *americana* Porter
(4) *F. virginiana* Duchesne

Ceratobasidium anceps (Bres. & Syd.) Jacks., leaf rot. Wis. (4).
Cercospora vexans Massal., leaf spot. Wis. (3,4), N.Y. (4).
Dendrophoma obscurans (Ell. & Ev.) H. W. Anderson, leaf spot. Conn., Ind., Md., N.C. (4).
Diplocarpon earliana (Ell. & Ev.) Wolf, leaf scorch. N. Mex. (1); Calif., Oreg. (2); Mo., Nebr. (3); Ga., Miss., N.C., N.Y. (4)
Ditylenchus dipsaci (Kuehn) Filip., leaf nematode. Calif., Oreg. (2).
Fabraea dehnii (Rab.) Nannf., on leaves. Mont. (?3).
Mycosphaerella fragariae (Tul.) Lindau leaf spot. Colo., Utah (1); Alaska, Wash. (2); general (3,4).
Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot, fruit rot. Maine, Md., N.J., N.Y., Wis.
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Wash. (1).
Phyllosticta fragaricola Desm. & Rob., leaf spot. N.C. (3).
Rhabdospora fragariae Atk., on leaves. N.Y. (3).
Rhizoctonia solani Kuehn, root and stem rot. Wash. (2).
Sclerotium rolfsii Sacc., southern blight. Fla. (3,4).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Pa. (1), Alaska (2), Mass. (4).
Synchytrium aureum Schroet., leaf gall. Wis. (4).
CRINKLE—virus (*Marmor fragariae* Holmes, Fragaria virus 2 K.M.Sm.). Oreg. (2).

Geum, avens

(1) *G. canadense* Jacq.
(1) *G. chiloense* Balb.
(3) *G. macrophyllum* Willd.
(4) *G. rivale* L., water, or purple, avens.
(5) *G. strictum* Ait.
(6) *G. triflorum* Pursh
(7) *G. virginianum* L.
(8) Species not determined or not designated.

Perennial herbs of temperate and subarctic regions, several of which are grown for ornament, chiefly forms of (2) in the United States; some of the native American species (1,3,4,5, 6,7) may be used in wild gardens; (4) also used in pharmacognosy.

Cercospora gei Bub., leaf spot. Wis. (6).
Cylindrosporium gei Farl., leaf spot. Wis. (8); on *G. radiatum* Michx. in Wis.
C. triflori H. C. Greene—Wis. (6).
Erysiphe polygoni DC., powdery mildew. Alaska (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Kabatia fragariae Solh., on leaves. Wyo.
Marsonia adunca Sacc., leaf spot. Mont., Wash. (3); Idaho (5).
Meloidogyne sp., root knot nematodes. Calif. (8).
Monochaetia discosioides (Ell. & Ev.) Sacc., on leaves. Wis. (6).
Peronospora potentillae d By. (*P. gei* Syd. ex Gäum.), downy mildew. Ill., Ind., Iowa, Kans., Nebr., Wis. (1); Calif. (2); Wis. (3,4,5); Wa. (8).
Phyllosticta sp., leaf spot. Wis., W.Va. (1).
P. decidua Ell. & Kell.—Wis. (1), Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,5).
Puccinia sieversii Arth. (III), rust. On *G. rossii* (R. Br.) Ser. in Colo.
Ramularia gei (Fckl.) Lindau, leaf spot. Wis. (5,6); Mo. (8). Probably identical with *Cercospora gei* and perhaps with *Cylindrosporium gei* and *C. triflori;* also reported as *Ovularia gei* Eliass.
Septoria gei Rob. & Desm., leaf spot. Ill., Mich., Nebr., Ohio, Wis. (1); Vt., Wis., Wyo. (3); Mich., Wis. (5); Del., Mass., N.Y., Wis. (7); Ill., Alaska (8).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Ind., Iowa, Md., N. Dak., Nebr., Ohio, Wis. (1); Wash., Wis. (3); Mich. (4); Pa., Wash., Wis. (5); N.Y., Wis. (7).
Synchytrium aureum Schroet., leaf gall. Wis. (1,5,7).
Whetzelia waldsteiniae (Pk.) Zundel, leaf smut. Mont., Wash. (6).
YELLOWS—virus (*Chlorogenus callistephi* Holmes var. *californicus Holmes,* Callistephus virus 1A K.M. Sm.). Calif. (2).

Gillenia

(1) *G. stipulata* (Muhl.) Baill., American ipecac.

(2) *Gillenia trifoliata* (L.) Moench, bowmansroot, Indian-physic.

Perennial herbs of the Eastern and Central States southward, sometimes grown in wild gardens; (2) also used in pharmacognosy.

Gymnosporangium exterum Arth. & Kern. (O,I), rust. Ind., Ky., Mo., N.C. (1); Tenn., Va., W.Va. (2). III on *Juniperus virginiana* L.

Hirtella

H. triandra Sw.

Shrub or small tree of tropical America.

Asterina inaequalis Mont. var. *nodulosa* Speg., black spot. P.R.

Holodiscus

Holodiscus spp., especially *H. discolor* (Pursh) Maxim., oceanspray, rockspirea, and *H. dumosus* (Nutt.) Heller

Deciduous flowering shrubs of ornamental value; *H. discolor* of range 1,2,4,5,12 and *H. dumosus* of range 9,10,11,13,14.

Cylindrosporium ariaefolium Ell. & Ev., leaf spot. Oreg.
C. filipendulae Thuem.—Wash.
Diplodia holodisci Barth. (*?D. mutila* (Fr.) Mont.), on branches. Wash.
Leptosphaeria sambuci Fautr., on branches. Wash.
Nectria cinnabarina Tode ex Fr., coral spot, twig canker. Wash.
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Wash.
Podosphaerea oxyacanthi (DC.) d By., powdery mildew. Idaho.
Rhopalidium cercosporelloidis Dearn., leaf spot. Idaho.
Septogloeum schizonoti Dearn., leaf spot. Wash.
Valsa ceratophora Tul. and *V. clavigera* Dearn. & Barth., on branches.
WITCHES'-BROOM—virus (*Nanus holodisci* Holmes, Holodiscus virus 1 (Zeller) K.M.Sm.). Oreg., Wash.

Ivesia

Ivesia spp.

Perennial herbs of foothills in the Rocky Mountain and Pacific States, sometimes grown in wild gardens.

Phragmidium horkeliae Garrett (III), rust. On *I. gordonii* (Hook.) Torr. & Gray in Utah.
P. ivesiae Syd. (I,II,III), rust. On *I. sericoleuca* Rydb. in Calif.
P. jonesii Diet. (O,I,II,III), rust. On *I. baileyi S.* Wats. in Nev. and Oreg.; on *I. gordonii* in Utah.

Kerria

K. japonica (L.) DC., kerria, globeflower.

Deciduous shrub of China, cultivated for ornament in zone 4.

Coccomyces kerriae V. B. Stewart (*Cylindrosporium kerriae* V. B. Stewart, *Higginsia kerriae* (V. B. Stewart) Nannf.), leaf and twig blight. Widespread, the Eastern States to Iowa and Tex.; Ga.
Nectria cinnabarina Tode ex Fr. (*Tubercularia vulgaris* Tode ex Fr.), coral spot. N.Y., Oreg., Wash.
Phomopsis japonica (Sacc.) Trav., twig blight. N.J., Ohio, Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Septoria sp., leaf spot. Md., N.J.

Malus

I. Crabapples

(1) *Malus angustifolia* (Ait.) Michx., southern crabapple; including *M. bracteata* Rehd. and *M. glaucescens* Rehd.

Large, partly evergreen, shrub or small tree of range 25,27,28,29,30.

(2) *M. baccata* (L.) Borkh., Siberian crabapple; and hybrid *M. adstringens* Zabel (*M. baccata* × *M. pumila* Mill.), a major crabapple.

Tree of China and northeastern Asia, parent of many edible crabapples.

(3) *M. coronaria* (L.) Mill., garland crabapple, wild sweet crabapple.

Stiff-branched shrub or small tree of range 16,19,22,24,25,27,28,29,30; also cultivated for ornament, zone 4.

(4) *M. floribunda* Sieb., Japanese flowering crabapple; including hybrids such as *M. arnoldiana* (Rehd.) Sarg. (=*M. floribunda* × *M. baccata*) and *M. scheideckeri* (Spaeth) Zabel (=*M. floribunda* × *M. prunifolia* Borkh.).

Profusely blooming shrub or tree of Japan, cultivated for ornament, zone 4.

(5) *M. fusca* (Raf.) Schneid. (*M. rivularis* Roem.), Oregon crabapple.

Small tree of range 1,2,4.

(6) *M. ioensis* (Wood) Britt., prairie crabapple.

Small tree of range 20,21,22,23,25,29; ornamental forms such as *M. ioensis* var. *plena* (Schneid.) Rehd., Bechtel's crabapple, and forms bearing fruit such as *M. soulardii* (Bailey) Britt. (=*M. ioensis* × *M. pumila*), Soulard crabapple, are in cultivation.

(7) *M. sieboldii* (Regel) Rehd., Toringo crabapple.

Shrub or small tree of Japan, cultivated for ornament, zone 5.

(8) *M. spectabilis* (Ait.) Borkh., Chinese flowering crabapple.

Small tree of China, cultivated for ornament, zone 4.

Armillaria mellea Vahl. ex Fr., root rot. Wash. (5).
Ascochyta coronaria Ell. & J. J. Davis: SEE *Marssonina coronaria.*
Cercosporella pirina Ell. & Ev., leaf spot. Ill. (3), Wis. (3,6).
Coniothyrium pirinum (Sacc.) Sheldon, leaf spot. Wis. (3).
Erwinia amylovora (Burr.) Winslow et al., fire blight. Widespread, Tex. (2); Pa., W.Va. (3); Ind., N.J., Tenn. (4); Pacific Northwest (5); Ind., Iowa (6).
Fabraea maculata Atk. (*Entomosporium maculatum* Lév.), leaf spot. Md. (2), Alaska (5).
Fomes applanatus (Pers. ex Fr.) Gill., heart rot. (5).
Gloeodes pomigena (Schw.) Colby, sooty blotch of fruit. Ind. (3).
Gymnosporangium sp. (O,I), rust. Fla. (2).
G. clavipes Cke. & Pk. (O,I), rust, N.J. (4), Conn. (8)
G. globosum Farl. (O,I), leaf rust. Ala., Ind., S.C., Va. (1); Kans. (2); N.J. (4).

G. juniperi-virginianae Schw. (O,I), rust, on leaves and fruit. Pa. to Fla. and Ala., Nebr. (1); Conn. to Va., Mo., and Nebr. (2); general (3,6); widespread (4); reported on (5); Tenn. (7); Conn. (8).
G. libocedri (P. Henn.) Kern (O,I), rust, on leaves and fruit. Oreg. (2,4,5), Alaska (5). III on *Libocedrus decurrens* Torr.
G. nelsoni Arth. (O,I), rust, on leaves and fruit. Alaska, Wash. (5). II and III on *Juniperus* spp.
G. nootkatense (Trel.) Arth. (O,I), rust, on leaves. Alaska, Wash. (5). II and III on *Chamaecyparis nootkatensis* (Lamb.) Spach.
Illosporium malifoliorum Sheldon, leaf spot. W.Va. (3).
Leptothyrium pomi (Mont. & Fr.) Sacc., flyspeck of fruit. Fla. (8).
Marssonina coronaria (Ell. & J. J. Davis) J. J. Davis, leaf spot. Ind., Iowa, Wis. (3); Mo., Wis. (6).
Nectria cinnabarina Tode ex Fr., coral spot, twig blight. Alaska (2,5).
Neofabraea malicorticis (Cordley) Jacks., northwestern anthracnose. Oreg. (5).
Nummularia discreta (Schw.) Tul., blister canker. W.Va. (3).
Oidium pyrinum Ell. & Ev., powdery mildew. Wis. (3).
Pellicularia koleroga Cke. (*Corticium stevensii* Burt), thread blight. La. (1).
Penicillium expansum (Lk.) Thom—Va. (1, on *M. glaucescens*).
Phomopsis sp., on twigs. Alaska (2).
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Wash. (2,5).
Phyllosticta sp., leaf spot. Iowa (4).
P. solitaria Ell. & Ev., leaf spot. Kans. (1); Ohio, Tex. (2); Ind., Iowa, W.Va. (3).
P. zonata Ell. & Ev., leaf spot. Iowa (6).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Physalospora obtusa (Schw.) Cke., black rot of fruit, frogeye leaf spot. Eastern and Central States (2); Ill., N.Y. (3); Ala., N.J. (4); Ill. (6).
Podosphaera leucotricha (Ell. & Ev.) Salm., powdery mildew. Ill. (4); Iowa (7).
P. oxyacanthae (DC.) d By., powdery mildew. Wash. (2); Wis. (3).
Septobasidium mariani Bres.—(1).
Septoria pyri Cast., leaf spot. Iowa (3).
Valsa ambiens Pers. ex Fr., on twigs. (2).
V. leucostoma Pers. ex Fr., canker dieback. (2), W.Va. (3).
Venturia inaequalis (Cke.) Wint. apud Thuem., scab. Va. (1) [sometimes resistant]; general (2); widespread (3,6,7).
ERINEUM—epidermal eruptions caused by mites. Alaska (5).

II. Apples

Malus sylvestris Mill.

Small to large deciduous tree of Europe and western Asia, progenitor of most cultivated apples, hardy in zone 3; also the progenitor of crabapples through hybridization with *M. baccata* although Rehder assigns this role to *M. pumila* Mill.

Agrobacterium rhizogenes (Riker et al.) Conn, infectious hairy root. Central States, Idaho, N.Y.
A. tumefaciens (E.F.Sm. & Town.) Conn, crown gall. General.
Alternaria spp., black rot of fruit usually following scald or spray injury, also moldy core. Cosmopolitan. Several unidentified species are reported as causing rot of fruit in cold storage in Wash.
A. mali Roberts, leaf spot, storage rot. Widespread. =*A. citri* Ell. & Pierce according to Fawcett & Bliss.
Aphelenchus avenae Bastian, in roots. Maine.
Armillaria mellea Vahl ex Fr., mushroom root rot. Widespread but most frequent in Pacific Coast States.
Ascochyta mali Ell. & Ev., on branches. Ind., Mich.
Aspergillus spp., especially *A. niger* v. Tiegh., fruit rot. Cosmopolitan but infrequent except in warm storage conditions, typically causing a dry rot, except for *A. niger* which causes a soft rot. *A. sclerotiorum* Huber also causes rot in cold storage.
Botryosphaeria ribis Gross. & Dug. and var. *chromogena* Shear, N. E. Stevens, & M. S. Wilcox, on branches causing dieback and canker, also black rot of fruit. Eastern and Southern States.
Botrytis spp., usually designated as *B. cinerea* Pers. ex Fr., gray-mold rot, spot rot. Cosmopolitan but noted principally in the Pacific Northwest.
B. mali Ruehle, fruit rot. Wash.
Cephalosporium carpogenum Ruehle, fruit rot. Wash.
Cercospora mali Ell. & Ev., leaf spot. Gulf States, Vt.
C. pyri Farl.—Iowa.
Chaetomella sp., fruit rot. Wash.
Cladosporium spp., fruit rot. Occasional. The following are specifically mentioned: *C. herbarum* Pers. ex Lk. (sometimes suggested as the conidial stage of *Mycosphaerella tulasnei* Jancz.) and *C. malorum* Ruehle.
Clasterosporium sp., papular scurf of twigs and bark. W.Va.
Clitocube tabescens (Scop. ex Fr.) Bres. (*C. monadelpha* Morg.), root rot. Ark., Fla., Okla., Tex., Va.
Colletotrichum fructus (F. L. Stevens & Hall) Sacc., spongy dry rot of fruit, also on twigs and leaves. Mass. to N.C. and Ill.
Comandra pallida A. DC., on roots. Wash.
Coniocybe nivea (Hoffm.) Rehm, on roots, possibly causing rot. Mo., N.Y., Pa.
Coniophora cerebella Pers., wood rot. Cosmopolitan.
Coniothecium sp. (*?chomatosporum* Cda.), secondary blister or cracking of fruit. N. Mex., Wash.
Coniothyrium spp., fruit rot. Wash.
C. fuckelii Sacc.: SEE *Leptosphaeria coniothyrium*.
C. pyrinum (Sacc.) Sheldon, leaf and fruit spot, also on twigs. Eastern and Central States to the Gulf States.
Corticium centrifugum (Lév.) Bres., fisheye rot of fruit, false anthracnose. Pacific Northwest, also occasional in the Eastern U. S. Records from Idaho, Ill., N.Y., Oreg., Va., Wash.
C. galactinum (Fr.) Burt, white root rot. Del. to Va., Ark. and Ill.
C. koleroga (Cke.) Hoehn.: SEE *Pellicularia koleroga*.
C. laetum (Karst.) Bres., limb blight. La., N.C.
C. litschaueri Burt, on bark. N. Dak., Oreg.
C. salmonicolor Berk. & Br., limb blight. Fla., La.
Coryneum foliicola Fckl., twig canker and fruit rot, also on leaves. Widespread.
C. longistipitatum Berl. & Bres., on branches. Alaska.
Cylindrocarpon angustum Wr., on bark. Oreg.
C. mali (Allesch.) Wr.: SEE *Nectria galligena*.
Cylindrocladium scoparium Morg., on roots. ?Tenn.
Cyphella marginata McAlp., on twigs. Oreg.
Cytospora spp., canker and dieback following environmental injuries. Widespread. Among the species reported are: *C. ambiens* Sacc., *C. chrysosperma* Pers. ex Fr., *C. leucosticta* Ell. & Barth., *C. leucostoma* Sacc., *C. microspora* (Cda.) Rab., *C. personata* Fr., *C. rubescens* Fr. Conidial stage of *Valsa* spp.
Cytospora sp. (*?C. leucostoma* Sacc.), canker. N. Mex.
Daedalea confragosa Bolt. ex Fr. and *D. unicolor* Fr., wood rot, often on living trees. Widespread.
Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., wood rot. Cosmopolitan.
Diaporthe perniciosa El. & Em. Marchal (*Phomopsis mali* Roberts), leaf spot. Ark. Also reported to

cause fruit rot and twig canker. A synonym of *D. eres* Nits. according to Wehmeyer.

Diplodia spp., on branches. Occasional. In general, conidial stages of *Physalospora* spp.: *D. maura* Cke. & Ell.—N.C., S.C.; *D. mutila* (Fr.) Mont. (=*P. mutila* (Fr.) N.E.Stevens)—Oreg.; *D. pseudodiplodia* Fckl. (=*P. obtusa* (Schw.) Cke.) —N.Y.; *D. sarmentorum* Fr.—Oreg.

Dothiorella sp. and *D. mali* Ell. & Ev.: See *?Botryosphaeria ribis.*

Elsinoë piri (Woron.) Jenkins (*Sphaceloma pirinum* (Pegl.) Jenkins), anthracnose on leaves and fruit. Oreg., Wash.

Endomyces mali I.M.Lewis, fruit rot. Maine.

Epicoccum granulatum Penz., fruit rot. Wash.

Erwinia amylovora (Burr.) Winslow et al., fire blight. General.

Fabraea maculata Atk., leaf spot. Iowa.

Fomes applanatus (Pers. ex Fr.) Gill., butt rot, white-mottled heart rot. Eastern and Central States.

F. fomentarius (L. ex Fr.) Kickx, white spongy heart rot. New England, N.Y., Oreg.

F. pinicola (Sw.) Cke., brown crumbly heart rot. Idaho, Oreg.

F. pomaceus Pers. ex Lloyd, brown heart rot. Ohio.

Fumago vagans Pers. ex Fr., sooty mold. Occasional.

Fusarium spp., bullseye rot of stored fruit in Pacific Northwest; moldy core and rot of dropped fruit in eastern U. S. Species reported include: *F. avenaceum* (Fr.) Sacc. and *F. lateritium* Nees var. *fructigenum* (Fr.) Wr.

Fusarium spp., canker and dieback. Pacific Northwest. Species reported include: *F. acuminatum* Ell. & Ev., *F. lateritium* Nees, and *F. oxysporum* Schlecht.; secondary to drought, winter, or insect injury.

Fusicoccum pyrorum Chupp & Clapp: See *Phomopsis mali.*

Ganoderma curtisii (Berk.) Murr., wood rot. N.Y.

Gibberella baccata (Wallr.) Sacc., twig canker. Oreg.

Gliocladium viride Matr., fruit rot. Ill.

Gloeodes pomigena (Schw.) Colby, sooty blotch. Eastern and Central to Gulf States, rare westward.

Gloeosporium spp., fruit rot. Cosmopolitan. Most of the species reported, such as *G. cingulatum* Atk., *G. fructigenum* Berk., and *G. rufomaculans* (Berk.) Thuem., belong as conidial stages to *Glomerella cingulata* although forms differing in pathogenicity, environmental relations, and ability to form asci, e.g., *G. fructigenum*, are sometimes distinguished.

G. malicorticis Cordley: See *Neofabraea malicorticis.*

G. perennans Zeller & Childs: See *Neofabraea perennans.*

Glomerella cingulata (Ston.) Spauld. & Schrenk, bitter rot of fruit, also twig, branch, and trunk canker. General, especially in the Southeastern States; in Tex.; rare in the West.

G. rubicola (Ston.) Spauld. & Schrenk, bitter rot. Ill. Possibly a variety of *G. cingulata.*

Glutinium macrosporum Zeller, canker, fruit rot. Oreg.

Gymnosporangium clavipes Cke. & Pk. (O,I), rust, "quince rust," on fruit. Maine to N.C., Ark., and Mich. III on *Juniperus communis* L. and *J. virginiana* L.

G. globosum Farl. (O,I), rust, "hawthorn rust," on leaves. Maine to Ala., Kans., and Nebr. III on *J. virginiana.*

G. juniperi-virginianae Schw. (O,I), cedar rust, "cedar apple," on leaves and fruit. General east of Great Plains. III on *J. scopulorum* Sarg. and *J. virginiana.*

G. libocedri (P. Henn.) Kern (O,I), rust, on leaves and fruit. Calif., Oreg. III on *Libocedrus decurrens* Torr.

G. nidus-avis Thaxt. (O,I), rust. On leaves, fruit, and stems. Ind., Md., Miss., N.J. Not recorded on apple in Arthur's "Manual."

Helminthosporium papulosum Berg, black pox, excrescences on bark of branches and twigs, also fruit spot. Ind., Mass., Miss., N.J., Ohio, Pa., W.Va.; black pit—W.Va.

Hendersonia cydoniae Cke. & Ell., on leaves. Ill., N.Y.

H. mali Thuem.: See *Pleospora mali.*

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

Hormodendron cladosporioides (Fr.) Sacc., fruit rot. Wash.

Hydnum spp., sapwood rot, wound rot. Species reported include: *H. mucidum* Pers. (*?Mycoacia macrodon* (Fr.) L. W. Miller & Boyle), on much decayed wood; *H. ochraceum* Pers. ex Fr. (=*Steccherinum ochraceum* (Pers. ex Fr.) S. F. Gray); *H. septentrionale* Fr. (=*Steccherinum septentrionale* (Fr.) Banker). The reports are all from New England but doubtless widespread.

H. setosum Pers. (=*Mycoacia setosa* (Pers.) Donk), common on dead trunks of *Malus* spp. Central and eastern U. S.

Hymenochaete agglutinans Ell., sapwood rot, canker. Conn.

Hypholoma sublateritium Fr., root and collar rot following freezing. N.Y.

Hypoxylon spp., sapwood rot, wound rot, canker. Occasional. Species reported include: *H. atropunctatum* (Schw. ex Fr.) Cke., *H. howeianum* Pk., *H. perforatum* (Schw.) Curt., *H. rubiginosum* Pers. ex Fr., *H. serpens* Pers. ex Fr.

Illosporium malifoliorum Sheldon, leaf spot. Pa. to N.C. and Ind.

Lenzites spp., sapwood rot, wound rot. Cosmopolitan. Species reported include: *L. betulina* L. ex Fr., *L. saepiaria* Wulf. ex Fr., *L. trabea* Pers. ex Fr., and *L. vialis Pk.*

Leptosphaeria coniothyrium (Fckl.) Sacc., canker, fruit rot. Eastern and Central States, Okla., Wash.

Leptothyrium pomi (Mont. & Fr.) Sacc., flyspeck on fruit. General. Ascigerous stage reported to be *Microthyriella rubi* Petr.

Marasmius pyrinus Ell., on twigs. Ill.

Meloidogyne spp., root knot nematodes. Miss., Tex., Utah.

Microdiplodia sp., wound rot of fruit. Wash.

Monilinia fructicola (Wint.) Honey, American brown rot. General except in the Far South; Tex.

M. laxa (Aderh. & Ruhl.) Honey, blossom blight, European brown rot. Oreg., Wash.

Monochaetia mali (Ell. & Ev.) Sacc. & D. Sacc., canker, leaf spot. N.J. to S.C., Mo., and W.Va.

Mucor piriformis A. Fisch., fruit rot. Wash.

Mycosphaerella pomi (Pass.) Lindau (*Phoma pomi* Pass.), on leaves, fruit spot. New England to N.C., Ark., Mo., and Iowa.

M. sentina (Fr.) Schroet., leaf spot. Ill., N.J., Pa.

M. tulasnei Jancz., fruit rot. Wash.; on leaves. Oreg. Reported as the ascigerous stage of *Cladosporium herbarum*, q. v.

Myriangium asterinosporum (Ell. & Ev.) J. H. Miller, on scale insects infesting bark. Ga.

Myxosporium corticola Edg., bark canker, surface canker, fruit rot. New England to Md., Ill., and Mich.; Okla., Oreg., S.Dak. Has been related to various ascus stages in Europe, e.g., *Cryptosporiopsis corticola* (Edg.) Nannf., *Dermatea corticola* Arn., *Neofabraea corticola* C. A. Jørg., and *Pezicula corticola* (C. A. Jørg.) Nannf.

Nectria cinnabarina Tode ex Fr., twig canker, coral spot. Alaska and northern U. S.

N. coccinea Pers. ex Fr. (*Cylindrocarpon candidum* (Lk.) Wr.), branch and trunk canker. Reported from northern U. S. (New England to Wash.), but possibly mistaken for the following species.

N. galligena Bres. (*Cylindrocarpon mali* (Allesch.) Wr.), European canker. Eastern and Central States to N.C. and Miss.; Pacific coast.

Neofabraea malicorticis Jacks. (*Pezicula malicorticis* (Jacks.) Nannf.), northwestern anthracnose, black spot canker, also fruit rot. Calif., Ill., Maine, Mass., ?Nebr., Okla., Oreg. Wash.

N. perennans Kienh. (*Gloeosporium perennans* Zeller & Childs) perennial canker, bullseye rot of fruit. Idaho, Maine, Mont., Oreg., Wash.

Nummularia discreta (Schw.) Tul., blister canker. East of the Rocky Mountains, especially in the upper Mississippi and lower Missouri River Valleys.

Oospora spp., fruit rot. Occasional.

Pellicularia koleroga Cke. (*Corticium koleroga* (Cke.) Hoehn.), thread blight. W.Va. and Ind. to Gulf States.

Penicillium spp., blue-mold rot, soft rot, core rot. Cosmopolitan. Specifically distinguished as *P. expansum* Lk. ex Thom, but various other names, in part synonymous, such as *P. glaucum* Lk. and *P. leucopus* Biourge, are reported. Other species reported include: *P. martensii* Biourge, *P. olivino-viride* Biourge, *P. puberulum* Bainier, *P. verrucosum* Dierckx, and *P. viridicatum* Westling.

Peniophora cinerea (Pers. ex Fr.) Cke., twig rot. Maine, N.Y.

Pestalotia spp., leaf spot. *P. concentrica* Berk. & Br., reported from Md. to N.C. and Ind., also Idaho, is the name most frequently specified. *P. hartigii* Tub. is reported to cause rotting of stored fruit in Wash.

Pezizella oenotherae (Cke. & Ell.) Sacc., on leaves and twigs. Md.

Phialophora malorum (Kidd & Beaum.) McColloch (*Sporotrichum carpogenum* Ruehle), fruit spot and rot, twig canker. Ind., Va., Wash.

Pholiota adiposa Fr., brown cubical heart rot. Minn.

Phoma spp., twig blight, fruit rot. Widespread. *P. ambigua* Sacc. (=*Phomopsis ambigua* (Sacc.) Trav.) is the conidial stage of *Diaporthe ambigua* Nits.; *Phoma mali* Schulz. & Sacc. is probably a synonym. *P. pomorum* Thuem. is reported to cause a fruit spot in the Southeastern States.

P. pomi Pass.: SEE *Mycosphaerella pomi.*

Phomopsis mali Roberts, ?rough-bark disease. Va., Ohio, Central States, and the Pacific Coast States. Said to be the conidial stage of *Diaporthe perniciosa* Marchal. Wehmeyer regards this, and also *D. ambigua*, as synonyms of *D. eres* Nits. SEE ALSO *Pseudomonas papulans.*

Phoradendron flavescens (Pursh) Nutt., mistletoe. N.C., Tex.

P. flavescens var. *macrophyllum* Engelm.—Ariz., N.Mex.

Phyllosticta spp., on leaves, petioles, and twigs. Widespread. Species reported include: *P. clypeata* Ell. & Ev.—Oreg., ?Ill.; *P. limitata* Pk.—Mass. to Va., Ark., and Ind.; *P. mali* Prill. & Del.—W.Va.

P. prunicola Sacc., scurfy bark. Md. to N.C. and Ohio, also Kans. SEE ALSO *Phomopsis mali* and *Pseudomonas papulans.*

P. solitaria Ell. & Ev., blotch of fruit, also leaf spot and twig canker. General except New England and the Far South; on nursery stock only in the Pacific Coast States and Tex.

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Ark., Nev., N.Mex., Tex.

Physalospora obtusa (Schw.) Cke. (*Sphaeropsis malorum* Pk.), black rot of fruit, frogeye leaf spot, twig and branch cankers. General from Atlantic coast to the Great Plains; also reported in Calif. but the black rot fungus in the Northwest is predominantly the following species.

P. mutila (Fr.) N.E.Stevens (*Diplodia mutila* (Fr.) Mont.), black rot, canker. Calif., Mont., Oreg., Wash.

P. rhodina (Berk. & Curt.) Cke., on roots. Ky.

Phytophthora cactorum (Leb. & Cohn) Schroet., collar rot, fruit rot (chiefly of fallen fruit). Widespread, Ark.

Plenodomus fuscomaculans Coons, canker. Calif., Mich.

Pleospora fructicola (Newton) Ruehle, fruit rot. Wash.

P. herbarum (Pers. ex Fr.) Rab. var. *citrorum* Sacc., fruit rot. Pacific Coast States.

P. mali Hesler (*Hendersonia mali* Thuem.), on twigs. N.Y.

Pleurotus ulmarius Fr., wound rot. Occasional.

Podosphaera leucotricha (Ell. & Ev.) Salm. and *P. oxyacanthae* (DC.) d By., powdery mildew. General. The two species differ in technical details but are similar pathologically; both occur in all apple sections of the U. S., the former being reported most commonly in the Western States.

Polyporus spp., sapwood or heart rot, sometimes on living trees. Occasional. Species reported in this connection include: *P. admirabilis* Pk.—New England, N.Y.; *P. adustus* Willd. ex Fr.—New England, N.Y.; *P. albidus* Schaeff. ex Fr.—N.Y.; *P. caesius* Schrad. ex Fr.—N.Y.; *P. fissilis* Berk. & Curt. and *P. galactinus* Berk.—New England, N.Y.; *P. gilvus* Schw. ex Fr.—Ind.; *P. hirsutus* Wulf. ex Fr.—widespread; *P. lacteus* Fr.—Ind., N.C., Va., Pacific Northwest; *P. pubescens* Schum.—Minn.; *P. resinosus* Schrad. ex Fr.—Minn.; *P. spumeus* Sow. ex Fr.—Conn.; *P. spumeus* var. *malicola* Lloyd—N.Y.; *P. sulphureus* Bull. ex Fr.; *P. tulipiferus* (Schw.) Overh.—Md., Minn., N.Dak., N.Y., Vt.

P. versicolor L. ex Fr., collar rot, heart rot, wound rot, sappy bark. Widespread.

Poria spp., wood rot, root rot. Reported species include: *P. ambigua* Bres.—Calif., Tenn.; *P. pannocincta* Rom.—N.Y.; *P. spissa* (Schw.) Cke.—Mich.

Pratylenchus pratensis (De Man) Filip., in roots. Calif. Associated with little leaf.

Pseudomonas melophthora Allen & Riker, soft rot associated with maggot injury. Wis.

P. papulans Rose, blister spot of fruit, ?scurfy bark. Ark., Ind., Mo., Pa. Etiological connection with "rough-bark disease" and "measles" is in controversy.

P. syringae Van Hall, blast of flowers and young shoots. Ark., Calif.

P. syringae var. *papulans* (Rose) M.A.Sm., blister spot of fruit. Ark., Ill., Ind., Mo., Pa., Va. Probably not related to scurfy bark.

Radulum aterrimum Fr., on bark, ?canker. Minn.

Ramularia spp., fruit rot. Occasional. Species reported include: *R. macrospora* Fr.—Md., Mass.; *R. magnusiana* (Sacc.) Lindau—Pacific Northwest.

Rhabdospora rhodina (Pk.) O. Kuntze, on bark, ?canker. Minn.

Rhizoctonia solani Kuehn, seedling root rot. Tex., Wash.

Rhizopus nigricans Ehr., rot of overripe or injured fruit. Cosmopolitan.

Roesleria hypogaea Thuem. & Pass., root rot of seedlings. N.Y.

Rosellinia necatrix (Hart.) Berl., white root rot. Calif.

Schizophyllum commune Fr., secondary bark and sapwood rot, occasionally green-fruit rot. General except in the South; Okla. Said to be the primary cause of death of orchard and other trees in Europe; enters through wounds.

Sclerotium rolfsii Sacc., seedling blight. Ky., Md., Va., Tex.

Scolecosporium pedicellatum Dearn. & Overh., on bark following insect injury. Pa.

Septobasidium spp., on scale insects infesting twigs (sometimes reported as canker or limb blight). Chiefly in the Southern States. Species reported include: *S. curtisii* (Berk. & Desm.) Boed. & Steinm., *S. filiforme* Couch, and *S. mariani* Bres. in N.C.; *S. pseudopedicellatum* Burt—N.Y. to

Miss., Tex., and W.Va.; *S. retiforme* in the Gulf States.

Septoria piricola Desm.—Iowa.

S. pyri Cast.—Iowa.

Sphaeropsis malorum Pk. (not *S. malorum* Berk.), black rot, canker, leaf spot. The conidial stage of *Physalospora obtusa* occurs commonly in the North Central and Northeastern States, the ascigerous stage chiefly in the South.

Sporonema oxycocci Shear, fruit rot. Md.

Sporotrichum carpogenum Ruehle and *S. malorum* Kidd & Beaum.: SEE *Phialophora malorum.*

Stemphylium congestum Newton and var. *minor* Ruehle, fruit spot and rot. Wash. Other *Stemphylium* spp. on apple have an ascigerous stage in *Pleospora.*

Stereum spp., wood rot. Occasional. Species reported include: *S. albobadium* (Schw.) Fr.—Tenn.; *S. gausapatum* Fr.—Ohio; *S. hirsutum* Willd. ex Fr.—Mont.; *S. murrayi* (Berk. & Curt.) Burt—Vt.

S. purpureum Pers., heart rot, root rot, silver leaf. Kans., Maine, Minn., N.Y., Pacific Northwest.

Trametes spp., wood rot. Species reported include: *T. hispida* Bagl. (=*T. peckii* Kalchb.), wound rot, in Colo., Mont., Wash., Wis.; *T. malicola* Berk. & Curt., brown spongy rot—widespread.

Trichoseptoria fructigena Maubl., fruit rot. N.Y.

Trichothecium roseum Lk. ex Fr. (*Cephalothecium roseum* Cda.), pink rot. General.

Tympanis conspersa (Fr.) Rehm, on twigs. N.H., N.Y., Va.

Valsa spp., *V. ambiens* Pers. ex Fr. and *V. leucostoma* Pers. ex Fr., on twigs, ?canker and dieback. New England and North Central States, occasionally in the West. Associated with the conidial stages in *Cytospora;* secondary, following environmental or other injuries, or saprophytic.

V. americana Berk. & Curt.—Ga.

Valsella melastoma (Fr.) Sacc., on branches. Wash.

V. papyriferae (Schw.) Berl. & Vogl., on winter-injured bark. Oreg.

Venturia inaequalis (Cke.) Wint. apud Thuem. (*Fusicladium dendriticum* (Wallr.) Fckl.), scab. General, except in the Far South.

Xylaria spp., black root rot. Chiefly in Eastern and Central States. Species reported include: *X. mali* Fromme—Pa., Md. to Ga., Ala., Ark., and Ill.; *X. polymorpha* Pers. ex Grev. (chiefly saprophytic) —N.Y. to Va. and Ind., also Oreg.

X. longeana Rehm, root and trunk rot. Va.

FLAT LIMB—?virus, symptoms of "rough-bark disease" type. Calif.

MOSAIC (infectious variegation)—virus (*Marmor mali* Holmes, Pyrus virus 2 (Bradford & Joley) K.M. Sm.). Eastern States (Conn., Maine, Mich., N.Y.), Mo., Calif., Wash.

MOSAIC, YELLOW—virus (*Marmor rosae* Holmes, Rosa virus 1 (White) K.M.Sm.). Susceptibility shown experimentally in Calif.

BITTER PIT (Baldwin spot, stippen, storage pit)—physiological; occurs chiefly in common storage or after removal from cold storage and is associated with irregularity of moisture supply, overstimulation by fertilizer or by pruning, and picking before maturity. General.

BLACK END—physiological, probably drought injury. Ala., Oreg., Wash.

BLACK HEART (of wood)—?freezing injury. Widespread.

BOX SCALD—superficial injury to skin of fruit packed in boxes of certain kinds of wood, especially Douglas fir. Pacific Northwest.

BROWN BARK SPOT—undetermined. Ind., Ky., Mont., Wash.

BROWN CORE—physiological injury to McIntosh variety owing to excessive nitrogen or low temperature in storage. Mich.

BURR KNOT (noninfectious hairy root)—hereditary form of adventitious root growth in certain varieties.

CALLUS-KNOT, GRAFT-KNOT—wound overgrowth owing to defective union of scion and stock. Often mistaken for crown gall.

CHLOROSIS—mineral deficiency, usually of iron, in alkaline soils. Chiefly in the Western States.

COLLAR ROT, NONPARASITIC FORMS—environmental injury, chiefly winter-injury, drought and flooding, and ?lack of aeration

CORK, "DROUGHT SPOT" or EXTERNAL CORK, INTERNAL CORK, "DROUGHT" DIEBACK, and ROSETTE, q. v., in part—boron deficiency. Northeastern States to Ind. and Ky., Pacific Coast States, and probably elsewhere.

INTERNAL BARK NECROSIS—necrosis of Golden and Red Delicious varieties, cause unknown. General. According to E.M.Hildebrand this disease and "measles," q. v., are synonymous. Boron deficiency is often a factor but not the only one, low pH, calcium and magnesium deficiency, toxic levels of manganese, iron, and aluminum also being important. Rome Beauty and McIntosh varieties in the same orchards are not affected.

INTERNAL BREAKDOWN—physiological, associated with overmaturity, delayed cool storage, high temperature. General in certain varieties.

INTERNAL BROWNING—physiological, characteristic of certain varieties, e.g., Yellow Newtown, grown in cool cloudy weather; accentuated by low storage temperature.

JONATHAN SPOT—physiological, associated with dry weather and delayed cool storage; occurs in Jonathan and certain other varieties throughout the U.S.

LEAF SCORCH—magnesium deficiency. Maine.

MEASLES (reddish, areolate pimples on bark)—cause unknown but associated with unthrifty general growth; boron deficiency suspected in some cases. Reported throughout the U.S. but often confused with rough-bark disease, black pox, and internal bark necrosis; typical form occurs in the Ozark region. Ind., N.Mex., Ohio, Pa., W.Va. Pustular type of measles occurring in the Ozark region is caused by oviposition of apple leafhopper, *Typhlocyba pomaria* McAtee. Also reported in Minn.

MEASLES, FALSE—internal or eruptive form, caused by manganese toxicity. W.Va. See also INTERNAL BARK NECROSIS.

PHYSIOCHEMIC INJURY—injury to collar and root system due to complex effects of low temperature and other environmental circumstances increasing susceptibility of tree to cold. Central and Southern apple-growing areas of eastern U.S. (Phytopath. 40:355).

ROSETTE, LITTLE LEAF—mineral deficiency, in part ?boron, in other cases usually zinc. Occasional in the Eastern and Central States, also the Pacific Northwest; reported in Calif., Idaho, Mont., Oreg., Utah, Wash., Wyo. See also *Pratylenchus pratensis.*

SCALD (discoloration and necrosis of fruit skin)—physiological, caused by accumulation of volatile respiratory products in storage; controlled by oiled-paper wraps and packing material. General.

SCURFY BARK—undetermined, has been ascribed to *Pseudomonas syringae* var. *papulans,* q.v., but not confirmed.

SOFT SCALD, DEEPSCALD—physiological, associated with delayed storage and low temperature; not controlled by oiled wraps. Reported chiefly on Jonathan, Rome Beauty, and Stayman Winesap varieties.

SOGGY BREAKDOWN—physiological, associated with delayed storage and low temperature. Reported chiefly on Grimes Golden and Wealthy varieties.

SPOT, ROME BEAUTY SPOT (of leaves)—undetermined bacterium. Ill.

STIGMONOSE—dimpling and distortion of fruit, sometimes with internal corky masses, caused by feeding punctures of insects. Widespread.
SUNBURN (of fruit)—injury to skin by light or heat, superficially resembling storage scald.
SUNSCALD (of bark)—freezing injury to cambium of trunk and larger branches on side exposed to sun. Chiefly in the North Central States.
TARGET CANKER—undetermined bacterium. ?Md., Mo.
WATERCORE—physiological, caused by deficiency or irregularity of moisture supply, occurring generally in arid regions and especially on Winesap varieties.

Mespilus

M. germanica L., medlar

Shrub or small tree of southeastern Europe, long cultivated for its edible fruit; zone 5. Several varieties are distinguished.

Erwinia amylovora (Burr.) Winslow et al., fire blight. N.Y.
Fabraea maculata Atk., leaf spot. Calif.

Osmaronia

O. cerasiformis (Torr. & Gray) Greene, osoberry.

Deciduous shrub of range 1,2,4; grown for ornament.

Cylindrosporium nuttallii (Harkn.) Dearn. *(Septogloeum nuttallii* Harkn.), leaf spot. Calif., Oreg., Wash.
Gloeosporium osmaroniae Dearn., leaf spot. Wash. Probably same as the preceding.
Nectria subcoccinea Sacc. & Ell. *(?N. muscivora* Berk.), on branches. Calif.
Phyllactinia guttata (Fr.) Lév. *(P. corylea* Pers. ex Karst.), powdery mildew. Oreg.

Osteomeles

Osteomeles spp.

Evergreen shrubs of Asia and Polynesia, grown for ornament in warm regions.

Irene calostroma (Desm.) Hoehn., black mildew. T.H.
Physalospora obtusa (Schw.) Cke., on branches. T.H.

Peraphyllum

P. ramosissimum Nutt., squaw-apple.

Deciduous shrub. Range 4,12,13,14.

Gymnosporangium inconspicuum Kern (O,I), rust on leaves and fruit. Colo. III on *Juniperus utahensis* (Engelm.) Lemmon.
G. nelsoni Arth. (O,I), rust, on leaves and fruits. Colo., Utah. III on *Juniperus* spp.
Septoria peraphylli Pk., leaf spot. Utah.

Photinia

(1) *P. arbutifolia* (Ait.) Lindl. (*Heteromeles arbutifolia* Roem., *H. salicifolia* (Presl) Abrams), Christmasberry, toyon.
(2) *P. glabra* (Thunb.) Maxim.
(3) *P. serrulata* Lindl.
(4) *P. villosa* (Thunb.) DC.

Evergreen shrubs or small trees: (1) of range 3,4,5, grown for ornament and used in Christmas greens; (2,3) of China and Japan, cultivated for ornament in the Far South; (4), a deciduous shrub of East Asia, also cultivated in zone 4.

Cercospora sp. (not *C. heteromeles)*—Ga. (1,3).
C. heteromeles Harkn., leaf spot. Calif., Tex. (1).
Ceuthospora brevispora Cke. & Harkn., on leaves. Calif. (1).
Cytospora sp., dieback. Okla. (?4).
Erwinia amylovora (Burr.) Winslow et al., fire blight. Calif. (1), N.J. (4).
Fabraea maculata Atk., leaf spot. Calif. (1). Sometimes distinguished as a special form but not formally described.
Fusicladium photiniicola McClain, scab of leaves and berries. Calif., Tex. (1); Okla. (4).
Gloeosporium sp., anthracnose, leaf spot. Miss. (3).
Gymnosporangium clavipes Cke. & Pk., rust. ?Mass. (4).
G. japonicum Syd. (O,I), rust. Calif. (1). III on *Juniperus chinensis* L.
Hadrotrichum heteromelis Ell. & Ev., on leaves. Calif. (1).
Lophodermium heteromelis (Phill. & Harkn.) Ell. & Ev., leaf spot. Calif. (1).
Myriangium duriaei Mont. & Berk., on scale insects infesting bark. Calif. (1).
Pestalotia sp., leaf spot. N.J. (3).
Phyllosticta heteromeles Cke. & Harkn., leaf spot. Calif., Tex. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,3).
Podosphaera leucotricha (Ell. & Ev.) Salm., powdery mildew. Calif. (2).
Pyrenopeziza heteromeles (Phill. & Harkn.) Sacc., on leaves. Calif. (1).
Septoria photiniae Berk. & Curt., leaf spot. Calif. (1), Pa. (3).
Sphaerotheca pannosa (Wallr.) Lév., powdery mildew. Oreg. (3).

Physocarpus, ninebark

Physocarpus spp.

Deciduous shrubs, mostly of the northern United States; *P. opulifolius* (L.) Maxim., occurring in range 22,23,24,25,26,27,28,29,30 is cultivated for ornament, zone 2.

Cenangium spiraeae (Schw.) Berk.: SEE *?Dermatea spiraeae.*
Cercospora spiraeae Thuem., leaf spot. Ind.
Dermatea spiraeae (Schw.) Cke., on branches. N.C., Pa.
Diaporthe eres Nits. *(D. neilliae* Pk.), on branches. N.Y., W.Va.
Fomes conchatus (Pers. ex Fr.) Gill., wood rot. N.Y.
Lophiotrema spiraeae (Pk.) Sacc., on dead branches. Mich., N.Y., Pa.
Marssonina lonicerae Harkn., leaf spot. Oreg.
M. neilliae (Harkn.) Magn., leaf spot. Calif., Tex., Wis.
Pestalotia monochaetoidea Sacc. & Ell., on dead twigs. W.Va.
P. monochaetoidea var. *parasitica* Dearn. & House, on leaves. N.Y., W.Va.
Phoma spiraeae Desm.: SEE *Diaporthe eres.*
Phyllosticta opulasteris Petr., leaf spot. Idaho.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. Va.
Poria spp.—N.Y.
Ramularia spiraeae Pk., leaf spot. Mich., N.Y., Wis.
Sphaeronema physocarpi Ell. & Ev., on branches. Va.
Sphaeropsis physocarpi Ell. & Ev., on branches. W.Va. *?Physalospora obtusa.*
Sphaerotheca humuli (DC.) Burr., powdery mildew. Mass. to Wis.

Stagonospora physocarpi Ell. & Ev., on twigs. W.Va.
Valsa ambiens Pers. ex Fr. and *V. opulifoliae* Pk., on dead branches. N.Y., W.Va.

Potentilla, cinquefoil, fivefinger

I. Shrub Species

Potentilla fruticosa L., bush cinquefoil.

Low shrub of mountain meadows and moist ground, ranging in the Northeast from Newfoundland to New Jersey, Illinois, and North Dakota; in the West from Montana and Idaho to New Mexico and California; of minor forage value to livestock and wildlife; useful in erosion control; sometimes grown for ornament, in some localities a weed.

Erysiphe polygoni DC., powdery mildew. Colo.
Phragmidium andersonii Shear (I,II,III), rust. General.
Sphaerotheca humuli (DC.) Burr., powdery mildew. Colo., Wis.

II. Herbaceous Species

(1) *Potentilla anserina* L., silverweed.
(2) *P. argentea* L.
(3) *P. grandiflora* L.
(4) *P. nepalensis* Hook.

Perennial herbs, distributed throughout the United States: (1) and (2) of Europe and North America, grown or collected for astringent constituents; (3) of Europe and (4) of Asia, grown for ornament.

Fabraea dehnii (Rab.) Nannf., leaf spot. Iowa, N.Y., Vt. (2).
Marssonina potentillae (Desm.) Magn., leaf spot. Calif., Colo., Mass., Mich., N. Mex., N.Y., Wis. (1); N. Mex. (2).
Peronospora potentillae d By., downy mildew. Iowa, Tex. (2); N.J. (3,4).
Phyllosticta anserinae Tehon, leaf spot. Ill. (1).
Ramularia arvensis Sacc., leaf spot. Wis., Alaska (1).
Sphaerotheca humuli (DC.) Burr., powdery mildew.

III. Range Plants

(1) *Potentilla filipes* Rydb.
(2) *P. glaucophylla* Lehm.
(3) *P. nuttallii* Lehm.
(4) Other species.

Perennial or biennial herbs of mountain meadows in the Western States; of some forage value to livestock and wildlife, or useful in erosion control.

Peronospora potentillae d By., downy mildew. Wyo. (3).
Phragmidium biloculare Diet. & Holw. (I,III), rust. Wash. (3,4); Calif., Idaho (4).
P. ivesiae Syd. (I,II,III), rust. On all the listed species within their range from Mont. to Colo., Calif., and Wash.
Sphaerotheca humuli (DC.) Burr., powdery mildew. Oreg., Wash. (1).
Taphrina potentillae (Farl.) Johans., leaf blister. Calif. (4).

IV. Miscellaneous Native and Introduced Species

(1) *Potentilla canadensis* L.
(2) *P. norvegica* L.
(3) *P. palustris* (L.) Scop., marsh fivefinger.
(4) Other species.

Perennial herbs of open ground (1,2), or of marsh areas (3); of use to wildlife; sometimes weeds in cultivated ground; most are rich in tannin.

Cercospora comari Pk., leaf spot. N.Y. (3).
Coleroa potentillae (Fr.) Wint.: SEE *Stigmatea potentillae.*
Discosia potentillae Tehon, leaf spot. Ill. (1).
Fabraea dehnii (Rab.) Nannf., leaf spot. Vt. to Miss., Mo., and N. Dak. (2).
Frommea obtusa (Strauss) Arth. (O,I,II,III), rust. Maine to S.C., Ark., and Minn.
Marssonina potentillae (Desm.) Magn., leaf spot. Wis. (1,2,3,4); Mich., Tex. (2); Calif., Wash. (4).
Mycosphaerella sp. (*Sphaerella potentillae* Oud.)—Colo. (1). Minn. (2).
M. innumerella (Karst.) Schroet., on leaves. Wis. (3).
Peronospora potentillae d By., downy mildew. Mass. to Md., Tex., and Wis. (2); N. Dak. (4).
Pezizella oenotherae (Cke. & Ell.) Sacc., leaf blight. Va. (1).
Phoma potentillica Allesch., stem blight. Tex. (2).
Phragmidium ivesiae Syd. (I,II,III), rust. Colo., Mont. (2); N.Y., Pa., Wis. (4).
P. potentillae (Pers.) Karst. (O,I,II,III), rust. Conn., Maine, Pa., Tex. (2); Maine, N.C., N.H. also Minn. to Nebr., N. Mex., and Oreg. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora potentillae Rostr., leaf and stem blight. Tex.
Pucciniastrum potentillae Kom. (II,?III), rust. Fla. (2); Maine to Tenn. and Minn. (on *P. tridentata* Soland.).
Pyrenopeziza coloradensis Ell. & Ev., on stems. Colo. (1).
Ramularia arvensis Sacc., leaf spot. Wis. (1); general (2); N.Y., Wyo., Alaska (4).
Rhizoctonia solani Kuehn, damping-off, root rot. Tex. (2).
Sclerotium delphinii Welch, crown rot. Conn. (1).
Septogloeum potentillae Allesch., leaf spot. Wis. (3).
Septoria purpurascens Ell. & G. Martin, leaf spot. N.Y. (2); Wis. (4).
S. rectae Greene—Wis. (on *P. recta* L.).
Sphaeria potentillae Schw.: SEE *Stigmatea potentillae.*
Sphaerotheca humuli (DC.) Burr., powdery mildew. Iowa, Tex. (2); Mich. (2); Mich., Wis. (3); Calif., Colo. (4).
Stigmatea potentillae Fr., on leaves. Mass. (1); Calif., N.C. 4. Reports of *Sphaeria potentillae* Schw. on (1) in Ark., Ga., Ill., Mass., Mo., Ohio, and Wis. appear to belong here. This fungus appears to be the same as that known in Europe as *Coleroa potentillae* (Fr.) Wint.
Synchytrium aureum Schroet., leaf gall. Pa. (1), Tex. (2).
?S. potentillae (Schroet.) Lagh., leaf gall. Mass. (1).
Taphrina potentillae (Farl.) Johans., leaf blister. Conn., Ind., Mass., Miss., N.J., N.Y., Ohio, Tenn., Va., Wis. (1); Tex. (2); Colo., Conn., Mich., N.C., Wis. (4).

MOSAIC—undetermined virus. N.Y. (3).
YELLOWS—virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.Y. (2).

Prunus,[13] almonds, apricots, cherries, peaches, and plums

I. Subgenus *Prunophora*, Apricots and Plums

A. Apricots

Prunus armeniaca L., apricot, and *P. mume* Sieb. & Zucc., Japanese apricot.

Small trees of western Asia: *P. armeniaca* cultivated in zone 5, chiefly in California; *P. mume* in the Far South; the familiar fruit, sweet and edible.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Widespread; Tex. *P. mume* is resistant.

Alternaria sp., blossom end rot, fruit spot. Calif. Possibly the following.

A. citri Ell. & Pierce, blossom-end rot, fruit spot. Calif.

Armillaria mellea Vahl ex Fr., root rot. Calif., Tex.

Botrytis cinerea Pers. ex Fr., green fruit rot (secondary), gummosis. Calif.

Cercospora circumscissa Sacc., leaf spot. Tex.

Cladosporium carpophilum Thuem., scab, freckle (on fruit), twig canker. Widespread; Okla., Tex.

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.

Coccomyces sp. *(Cylindrosporium padi* Auct.), leaf spot. Calif., Iowa, Mass., Tex., Vt.

Coryneum carpophilum (Lév.) Jauch, shoot blight, fruit spot. Widespread; causes shot hole in Calif.

Cylindrosporium padi Auct.: See *Coccomyces* sp.

Cytospora spp., especially *C. leucostoma* Sacc., dieback, twig canker, or secondary infection. Ariz., N.Y. Conidial stage of *Valsa* sp.

Dibotryon morbosum (Schw.) Th. & Syd., black knot. Colo., Iowa, N.Y.

Diplodia sp. *(?D. natalensis* P. Evans), on twigs. Calif.

Erwinia amylovora (Burr.) Winslow et al., fire blight. Colo., Fla., Nebr., Pa., Tex.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

Lambertella pruni Whetz., fruit rot. Calif.

Meloidogyne spp., root knot nematodes. Ariz., Tex.

Monilinia fructicola (Wint.) Honey, brown rot, usually of ripe fruit, sometimes blossom blight. Widespread but less common on this host in the Pacific Coast States than *M. laxa*.

M. laxa (Aderh. & Ruhl.) Honey, blossom and twig blight, brown rot of green and ripe fruit. Pacific Coast States.

Monochaetia rosenwaldia Khazanoff, trunk and limb gall. Calif.

Nectria cinnabarina Tode ex Fr., coral spot, dieback. Ind., Wash.

Phyllosticta circumscissa Cke., leaf spot. Calif.

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Okla., Tex.

Phytophthora cactorum (Leb. & Cohn) Schroet. and *P. cithrophthora* (R.E. & E.H.Sm.) Leonian, trunk canker. Calif.

Podosphaera oxyacanthae (DC.) d By., powdery mildew. Calif., Iowa.

Pseudomonas syringae Van Hall, bacterial canker, gummosis. Calif., Oreg.

Schizophyllum commune Fr., heart rot, usually following freezing injury. Tex., Wash.

Sclerotinia sclerotiorum (Lib.) d By., green fruit rot, twig blight. Calif.

Septobasidium pseudopedicellatum Burt, on scale insects infesting bark. Miss.

Sphaerotheca pannosa (Wallr.) Lév. var. *persicae* Woron., powdery mildew. N.Y.

Stereum purpureum (Pers. ex Fr.) Fr., silver leaf. Calif.

Taphrina ?deformans (Berk.) Tul., leaf curl. S.C.

Trametes hispida Bagl., heart rot. Colo.

Tranzschelia discolor (Fckl.) Tranz. & Litv. *(T. pruni-spinosae* var. *discolor* (E. Fisch.) Dunegan) and *T. pruni-spinosae* (Pers.) Diet. (formerly reported as *T. pruni-spinosae* var. *typica* (E. Fisch.) Dunegan) (II,III), rust. Calif., Miss., N. Mex., Tex. Reported as the latter species but may be either one or both, since, according to Dunegan, both species occur on apricot.

Valsa leucostoma Pers. ex Fr., dieback, twig canker. Mo., Tex.

Venturia ?cerasi Aderh., fruit spot. Ky.

Verticillium albo-atrum Reinke & Berth., blackheart, wilt. Calif., Utah, Wash.

Diamond canker—undetermined virus. Calif.

Mosaic—virus(es). Peach mosaic virus *(Marmor persicae* Holmes, Prunus virus 5 (Hutchins) K.M.Sm.). Reported in Calif., probably Colo.; undetermined virus—Wash.

Phony disease—peach phony disease virus *(Nanus mirabilis* Holmes, Prunus virus 3 (Hutchins) K.M. Sm.), natural spread from peach. Ga.

Ring pox, ring spot, apricot pox—ring pox virus. Colo., Wash.

Ring spot—ring spot virus. Natural infection of apricot is reported for this virus, originally described from peach, in western U.S.

Rosette—?peach rosette virus *(Carpophthora rosettae* (Holmes) Holmes, Prunus virus 2 (McClintock) K.M.Sm.). Ill. Susceptibility of apricot to this virus has been demonstrated.

Yellow bud mosaic, Winters peach mosaic—peach yellow bud mosaic virus. Calif.

Yellows—peach yellows virus *(Chlorogenus persicae* Holmes var. *vulgaris* Holmes, Prunus virus 1 Kunkel ex K.M.Sm.). Occasional in the Eastern States.

Arsenical injury—Calif.

Boron deficiency—internal browning, cork, cracking in fruit. Wash.

Chlorosis—alkali injury, mineral deficiency. Ariz., Calif., Tex.

Exanthema—copper deficiency. Calif.

Gummosis, "sour sap"—adverse soil and moisture relations; sometimes infection by *Pseudomonas syringae*. Ariz., Calif., N.J., Wash.

Little leaf—zinc deficiency. Calif., Oreg., Wash.

Mottle leaf—manganese deficiency. Calif.

B. Plums

Prunus alleghaniensis Porter: See *P. maritima*, page 393.

Prunus americana Marsh., American plum, and *P. nigra* Ait. (*P. americana* var. *nigra* Waugh), Canada plum.

P. americana a small tree or shrub occurring throughout the United States except for the Far West and the Southwest, cultivated for fruit and for ornament, zone 3; *P. nigra* the northern ally of *P. americana*, in the Great Lakes and Northeastern States, cultivated zone 2.

Cercospora circumscissa Sacc., leaf spot. Ill., N.Dak., Nebr.

C. prunicola Ell. & Ev., leaf spot. Ala., La.

[13] Knowledge concerning the occurrence, hosts, identity, and relationships of the viruses affecting *Prunus* is undergoing such rapid change that no attempt is made here to complete the listing of the virus diseases of *Prunus* in all their aspects. For the most complete account available the reader is referred to "Virus Diseases and Other Disorders with Viruslike Symptoms of Stone Fruits in North America." U. S. Dept. Agr. Agr. Handb. 10, 284 pp. 1951. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price $2.50.

Cladosporium carpophilum Thuem., scab. Widespread.
Coccomyces prunophorae Higgins, leaf spot. Ind., Iowa.
Coryneum carpophilum (Lév.) Jauch, shoot blight. Oreg.
Diaporthe prunicola (Pk.) Wehm., twig canker. Iowa, Nebr.
Dibotryon morbosum (Schw.) Th. & Syd., black knot. Widespread; Okla., Tex.
Erwinia amylovora (Burr.) Winslow et al., fire blight. Wis.
Fomes fulvus (Scop. ex Fr.) Gill., brown heart rot. Widespread.
F. igniarius (L. ex Fr.) Kickx, heart rot. Mo.
Leptothyrium pomi (Mont. & Fr.) Sacc., flyspeck on fruit. Ill.
Monilinia fructicola (Wint.) Honey, blossom blight, brown rot. General.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla.
Phyllosticta circumscissa Cke. leaf spot. Calif., Ill.
P. prunicola (Op.) Sacc.—Iowa.
P. virginiana (Ell. & Halst.) Ell. & Ev.—Iowa, Kans.
Podosphaera oxyacanthae (DC.) d By., powdery mildew. Widespread.
Sclerotinia fructicola (Wint.) Rehm: SEE *Monilinia fructicola.*
Septobasidium burtii Lloyd—Fla.
Septoria pruni Ell., leaf spot. Iowa, Kans., Ky., N.Dak., Nebr.
S. purpureocincta Ell. & Ev.—Kans.
Taphrina communis (Sadeb.) Gies. (*T. decipiens* (Atk.) Gies., *T. longipes* (Atk.) Gies., *T. mirabilis* (Atk.) Gies., and *T. rhizipes* (Atk.) Gies.), causes plum pockets (bladder plum), hypertrophy of leaves and shoots but not witches'-brooming. Ark., Ill., Iowa, Kans., Mass., Mich., Miss., N.C., N.Y., Wis., Tex.
Tranzschelia pruni-spinosae (Pers.) Diet. (II,III), rust. Widespread, especially in the South.
Xanthomonas pruni (E.F.Sm.) Dows., bacterial leaf spot. Iowa, Mo., N.C., Ohio, Tex.
LINE PATTERN VIROSIS—virus (*Marmor lineopictum* Cation). Minn. (?on *P. americana*).

Prunus angustifolia Marsh.: See *P. munsoniana*, page 393.

Prunus cerasifera Ehrh. and *P. cerasifera* var. *atropurpurea* Jaeg.: See *P. domestica*, following.

Prunus domestica L., garden plum, prune.

Tree of Europe and western Asia, cultivated in many forms for fruit, zone 4. Included here also are records for *P. insititia* L., damson plum, cultivated in zone 4 and also locally naturalized in the East; *P. cerasifera* Ehrh., myrobalan plum, grown chiefly as an understock; *P. cerasifera* var. *atropurpurea* Jaeg., purple-leaf plum, grown for ornament in zone 3; *P. salicina* Lindl., Japanese plum, cultivated for fruit in zone 3; and *P. spinosa* L., blackthorn, or sloe, cultivated in zone 4 and also locally naturalized in the East.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Widespread; N.Y., Tex.
Alternaria sp., green mold of fruit. Idaho, Mich., Oreg.
Armillaria mellea Vahl ex Fr., root rot. Widespread.
Botrytis cinerea Pers. ex Fr., gray mold of fruit. Calif., Wash.
Cercospora circumscissa Sacc., leaf spot. Calif., Fla., Mass., Tex., Wash.
Cladosporium sp., green mold of fruit. Idaho, Oreg.
C. carpophilum Thuem., scab. Widespread; Calif., Iowa.
Coccomyces prunophorae Higgins (*Cylindrosporium prunophorae* Higgins), leaf spot, shot hole. Widespread; Iowa.
Coryneum carpophilum (Lév.) Jauch, leaf blight, shot hole. Calif. to Idaho and Wash.
Dermatea cerasi Pers. ex Fr., on branches. N.Y.
Dibotryon morbosum (Schw.) Th. & Syd., black knot. Widespread, except in the Far West.
Diplodia spp., *D. pruni* Fckl., *D. vulgaris* Lév., and other species, twig blight (secondary). Fla., N.J. Conidial stage of *Physalospora*, probably *P. obtusa* (Schw.) Cke.
Erwinia amylovora (Burr.) Winslow et al., fire blight. Occasional; Tex.
Fomes applanatus (Pers. ex Fr.) Gill., collar and root rot, white-mottled heart rot. Oreg.
F. fulvus (Scop. ex Fr.) Gill., brown heart rot. Widespread.
F. pinicola (Sw. ex Fr.) Cke. and *F. subroseus* (Weir) Overh., brown pocket rot. Pacific Northwest.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Lambertella pruni Whetz., fruit rot. Calif.
Lenzites saepiaria Wulf. ex Fr., brown heart rot. Pacific Northwest.
Meloidogyne spp., root knot nematodes. Fla., Tex.
Monilinia fructicola (Wint.) Honey, brown rot, blossom blight. General.
M. laxa (Aderh. & Ruhl.) Honey, blossom and twig blight, brown rot. Calif., Oreg., Wash.
Pellicularia koleroga Cke., thread blight. La.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Tex.
Phyllosticta circumscissa Cke., leaf spot. Iowa, Wash.
P. congesta Heald & Wolf, blotch of fruit, leaves, twigs. Ga., Tex. On *P. salicina* said to be a *Phyllostictina*, conidial stage of a *Guignardia*.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Phytophthora cactorum (Leb. & Cohn) Schroet., bark canker. Calif., Ind.
Podosphaera oxyacanthae (DC.) d By. and *P. oxyacanthae* var. *tridactyla* (Wallr.) Salm., powdery mildew. Occasional; Ga.
Polyporus hirsutus Wulf. ex Fr. and *P. versicolor* L. ex Fr., white pocket heart rot. Widespread.
Pratylenchus pratensis (De Man) Filip., in roots, associated with little leaf, q.v., Calif.
Pseudomonas syringae Van Hall, gummosis, shoot blight. Calif., Oreg.
Schizophyllum commune Fr., sapwood rot. Wash.
Septobasidium retiforme (Berk. & Curt.) Pat.—Tex.
Stereum purpureum (Pers. ex Fr.) Fr., silver leaf, heart rot. Wash.
Taphrina spp., leaf curl, witches'-broom. Occasional. Species reported include:
T. communis (Sadeb.) Gies. (*T. decipiens* (Atk.) Gies., *T. longipes* (Atk.) Gies., *T. mirabilis* (Atk.) Gies., and *T. rhizipes* (Atk.) Gies.), plum pockets (bladder plum), sometimes leaf curl but not witches'-broom. Ala.
T. insititiae (Sadeb.) Johans. (*?T. pruni*, q.v.), witches'-broom. Eastern States. ?Occurrence in North America.
T. pruni Tul. (*T. rostrupiana* (Sadeb.) Gies., *T. insititiae*), pockets, bladder plum. N.J., N.Y. [Manitoba]. See also Mix, Kans. Univ. Sci. Bul. 33, pp. 1-167. Doubt expressed that this species occurs in North America.
Tranzschelia discolor (Fckl.) Tranz. & Litv. (*T. pruni-spinosae* var. *discolor* (E. Fisch.) Dunegan) (II,III), rust. Calif., Oreg. Some reports under *T. pruni-spinosae* may belong here.
T. pruni-spinosae (Pers.) Diet. (II,III), rust. Widespread, especially in the Southern and Pacific Coast States.
Valsa leucostoma Pers. ex Fr., dieback, canker. Widespread.

Verticillium albo-atrum Reinke & Berth., blackheart, seedling wilt. Calif.

DIAMOND CANKER—prune diamond canker virus. Calif. Limited to Agen variety of *P. domestica.*

DWARF—prune dwarf virus *(Nanus pruni* Holmes, Prunus virus 6 (Thomas & Hildebrand) K.M.Sm.). N.Y.

GOLDEN-NET—golden-net virus. On *P. salicina* in Colo.

LEAF DROP—?virus of sour cherry yellows virus complex. On *P. domestica* in N.Y.

LINE PATTERN VIROSIS—line pattern virus *(Marmor lineopictum* Cation). Ky., Mich., Ohio, Oreg., Wash.; a similar disease reported from Calif. ("Vacaville plum mosaic"). Reports are on *P. salicina;* susceptibility of *P. domestica* vars. demonstrated experimentally.

LITTLE PLUM, LITTLES—little peach virus *(Chlorogenus persicae* Holmes var. *micropersica* Holmes, Prunus virus 1A K.M.Sm.). Occasional in range of little peach virus. Some *P. salicina* vars. are symptomless carriers.

MOSAIC—virus. In part the prune dwarf and the line pattern viruses, as above; in part also the peach mosaic virus *(Marmor persicae* Holmes, Prunus virus 5 (Hutchins) K.M.Sm.); in natural infection of *P. domestica* (Agen variety), a few varieties of *P. salicina,* and *P. cerasifera; P. insititia* has been infected experimentally. These or other undetermined or unspecified viruses may be involved in reports on *P. domestica* of "plum pox" in Ill., Ky., Minn., and "prune mottle" in N.Y. and Wash. In Calif. the Standard prune-constricting mosaic virus is reported on Standard variety of *P. domestica,* and one or more apparently distinctive undetermined viruses occur on *P. domestica* and *P. salicina.*

RING SPOT—ring spot virus. Common in *P. domestica* and *P. salicina.* Natural infection of *P. cerasifera* seedlings reported; *P. insititia* has been infected experimentally. Symptoms generally obscure or absent.

ROSETTE—?peach rosette virus *(Carpophthora rosettae* Holmes, Prunus virus 2 (McClintock) K.M.Sm.). On *P. salicina* in Ala.; on undesignated plum species in Ga. and Tex. Susceptibility of *P. insititia* and *P. salicina* has been demonstrated.

VEIN-CLEARING—sweet cherry vein-clearing virus *(Marmor nerviclarens* Zeller & Evans, Prunus virus 8 Zeller & Evans). Oreg.

WHITE SPOT—plum white spot virus. Calif. (on *P. salicina).*

YELLOWS—peach yellows virus *(Chlorogenus persicae* Holmes var. *typica* Holmes, Prunus virus 1 (Kunkel) K.M.Sm.). Occasional in the Eastern States.

BROWN BARK SPOT—cause unknown, ?arsenical poisoning. Mont.

CHLOROSIS—mineral deficiency, alkaline soil. Calif., Idaho.

EXANTHEMA—copper deficiency. Calif., Fla.

FLUORINE INJURY (marginal scorch)—Wash.

GUM SPOT (drought spot)—irregularity of moisture supply. N.Y., Pacific Northwest.

LEAF ROLLING—cause unknown. Wash.

LITTLE LEAF—zinc deficiency. Calif., Oreg., Wash. Undetermined cause, sometimes associated with root infestation by *Pratylenchus pratensis*—Calif.

MYROBALAN ASTEROID, or CHLOROTIC SPOT. Occasional wherever plums grown. Cause unknown. Not related to necrotic asteroid spot virus of peach, *Marmor astri* Holmes.

MYROBALAN MOTTLE—genetic abnormality. Occasional in seed stocks. Calif. Not related to prune mottle.

Prunus gracilis Engelm. & Gray: See *P. munsoniana,* this page.

Prunus hortulana Bailey: See *P. munsoniana,* below.

Prunus insititia L.: See *P. domestica,* page 392.

Prunus maritima Marsh., beach plum.

Shrub of coastal areas, Maine to Va., sometimes cultivated for fruit. Includes also records for *P. alleghaniensis* Porter, Allegheny plum, of inland areas, Maine to Va.; *P. umbellata* Ell., flatwoods plum, of the coastal areas, N. C. to Tex.; and *P. subcordata* Benth., Pacific plum, Klamath plum, occurring in Oregon and California, sometimes grown for fruit.

Cylindrosporium sp., leaf spot. Fla.

Dibotryon morbosum (Schw.) Th. & Syd., black knot. Ala., Mass., N.Y., Oreg.

Monilinia fructicola (Wint.) Honey, brown rot, twig blight. Calif., Fla.

Podosphaera oxyacanthae (DC.) d By., powdery mildew. Fla., Md.

Taphrina communis (Sadeb.) Gies. *(T. decipiens* (Atk.) Gies., *T. longipes* (Atk.) Gies., *T. mirabilis* (Atk.) Gies., *T. rhizipes* (Atk.) Gies.), plum pockets (bladder plum), sometimes leaf curl, but not witches'-broom. Mass. to Fla.

T. pruni-subcordatae (Zeller) Mix, pockets, witches'-broom. Calif., Colo., Oreg. (on *P. subcordata).*

Tranzschelia pruni-spinosae (Pers.) Diet. (II,III), rust. Calif. (on *P. subcordata*); Fla., Ga. (on *P. umbellata*).

Prunus mexicana S. Wats.: See *P. munsoniana,* below.

Prunus mitis Beadle: See *P. munsoniana,* following.

Prunus munsoniana Wight & Hedr., wildgoose plum.

Tree of range 20,22,25,29; cultivated in zone 5. Records also cover *P. angustifolia* Marsh., chickasaw plum, of range 20,22,25,28,29,30; *P. gracilis* Engelm. & Gray, Oklahoma plum, of range 16,22,25; *P. hortulana* Bailey, Hortulan plum, range 22,25,27,29; *P. mexicana* S. Wats., Mexican plum, of range 19,20,22,25,29,30; and *P. mitis* Beadle, of range 28,29,30.

Cercospora circumscissa Sacc., leaf spot. Kans.

Cladosporium carpophilum Thuem., scab. Iowa.

Coccomyces prunophorae Higgins *(Cylindrosporium prunophorae* Higgins), leaf spot. Ark., Fla., Ind., Iowa.

Cytospora ambiens Sacc., twig canker. Fla. (on *P. mitis).*

Diaporthe decorticans (Lib.) Sacc. & Roum., canker. Iowa.

D. pruni Ell. & Ev.—Iowa.

Dibotryon morbosum (Schw.) Th. & Syd., black knot. Ala., Ga., Miss.

Diplodia pruni Fckl.—Fla.

Fomes fulvus (Scop. ex Fr.) Cke., brown heart rot. Iowa, Va.

Leptothyrium pomi (Mont. & Fr.) Sacc., flyspeck. Mo.

Monilinia fructicola (Wint.) Honey, brown rot. General.

Pellicularia koleroga Cke., thread blight. Fla.

Phoradendron flavescens (Pursh) Nutt., mistletoe. Southern States.

Phyllosticta congesta Heald & Wolf, leaf blotch. Tex.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Physalospora obtusa (Schw.) Cke., on branches. Ala.

Podosphaera oxyacanthae (DC.) d By., powdery mildew. Iowa, Md., Nebr.

Taphrina sp., *?T. communis* (Sadeb.) Gies., *?T. pruni* (Fckl.) Tul., plum pockets. Fla. and Ala. to Okla. and Kans., S.Dak., Minn.

T. mirabilis (Atk.) Gies., bud and shoot hypertrophy. Central and Southern States. Also var. *tortilis* Atk., on fruit in the same area.

Tranzschelia discolor (Fckl.) Tranz. & Litv. (*T. pruni-spinosae* (Pers.) Diet. var. *discolor* (E. Fisch.) Dunegan) (II,III), rust. Central and Southern States on *P. hortulana* and *P. mexicana*. Some records on these species under the following name may belong here.

T. pruni-spinosae (Pers.) Diet. (II,III), rust. Central and Southern States.

LITTLE PEACH—virus (*Chlorogenus persicae* Holmes var. *micropersicae* Holmes, Prunus virus 1A K.M. Sm.). On *P. munsoniana* vars. Symptoms sometimes are masked.

PHONY DISEASE—virus (*Nanus mirabilis* Holmes, Prunus virus 3 (Hutchins) K.M.Sm.). Ga. Natural spread.

Prunus nigra Ait.: See *P. americana*, page 391.

Prunus salicina Lindl.: See *P. domestica*, page page 392.

Prunus spinosa L.: See *P. domestica*, page 392.

Prunus subcordata Benth.: See *P. maritima*, page 393.

Prunus umbellata Ell.: See *P. maritima*, page 393.

II. Subgenus *Amygdalus*, Almonds and Peaches

A. Almonds

Prunus amygdalus Batsch (*Amygdalus communis* L.), almond.

Small tree, grown sometimes as an ornamental but cultivated mainly in range 3 and 5 for the almonds.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Ala., Ariz., Calif., N.C.

Armillaria mellea Vahl ex Fr., mushroom root rot. Calif., N.C.

Cercospora circumscissa Sacc., shot hole. Calif., Oreg.

Cladosporium carpophilum Thuem., scab. Calif., Conn., Oreg.

Coryneum carpophilum (Lév.) Jauch (*C. beijerinckii* Oud.), blight, shot hole. Calif., Idaho, Oreg. ?Conidial stage of *Ascospora beijerinckii* Vuill.

Cyphella marginata McAlpine, on twigs. Oreg.

Gloeosporium amygdalinum Brizi, anthracnose, kernel rot, Calif.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Ariz.

Monilinia laxa (Aderh. & Ruhl.) Honey, blossom blight, brown rot. Calif., Oreg.

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.

Phytophthora cactorum (Leb. & Cohn) Schroet.—Calif.

P. citrophthora (R.E. & E.H.Sm.) Leonian, dieback. Calif.

Polyporus versicolor (L.) Fr., heart rot. Oreg.

Pseudomonas syringae Van Hall, bacterial shoot blight. Calif.

Schizophyllum commune Fr., wound rot. Calif.

Sclerotinia sclerotiorum (Lib.) d By., green fruit rot. Calif.

Tranzschelia discolor (Fckl.) Tranz. & Litv. (II,III), rust. Calif.

Verticillium albo-atrum Reinke & Berth., wilt. Calif., Ill.

Xanthomonas pruni (E.F.Sm.) Dows., bacterial leaf spot. Nebr.

BUD FAILURE, SHATTER TOP, CRAZY TOP, WITCHES'-BROOM—?virus. Calif.

CALICO, ALMOND—virus. Calif.

MOSAIC—peach mosaic virus (*Marmor persicae* Holmes, Prunus virus 5 (Hutchins) K.M.Sm.). Calif.

RING SPOT—?peach ring spot virus. Calif.

YELLOW BUD MOSAIC, WINTERS PEACH MOSAIC—virus. Calif.

YELLOWS—peach yellows virus (*Chlorogenus persicae* Holmes var. *vulgaris* Holmes, Prunus virus 1 (Kunkel) K.M.Sm.). W.Va.

CHLOROSIS—iron deficiency; in almond trees on peach roots. Calif.

LITTLE LEAF—zinc deficiency. Calif.

Prunus glandulosa Thunb.: See *P. triloba*, below.

Prunus tenella Batsch (*Amygdalus nana* L.), Russian almond.

Hardy bush, cultivated usually as an ornamental.

Cercospora circumscissa Sacc., leaf spot. Kans.

Phyllosticta virginiana (Ell. & Halst.) Ell. & Ev., leaf spot. Mont.

Prunus tomentosa Thunb.: See *P. triloba*, following.

Prunus triloba Lindl., flowering almond.

Small tree or shrub of China, cultivated for ornament, zone 5. Several horticulturally similar ornamental species, such as *P. glandulosa* Thunb., dwarf flowering almond, and *P. tomentosa* Thunb., Nanking cherry, are included.

Armillaria mellea Vahl ex Fr., root rot. Miss.

Botrytis cinerea Pers. ex Fr., blossom and twig blight. N.Y.

Corticium galactinum (Fr.) Burt, white root rot. Md.

Erwinia amylovora (Burr.) Winslow et al., twig blight. Ind.

Monilinia fructicola (Wint.) Honey, blossom and twig blight, brown rot. Conn., Kans.

Podosphaera oxyacanthae (DC.) d By., powdery mildew. Iowa.

Xanthomonas pruni (E.F.Sm.) Dows., bacterial spot. N.J.

B. Peaches and Nectarine

Prunus davidiana (Carr.) Franch. (*Amygdalus davidiana* (Carr.) Zabel), Chinese wild peach.

An early-flowering small tree, cultivated as rootstock and as an ornamental.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Calif.

Armillaria mellea Vahl ex Fr., mushroom root rot. Calif.

Coryneum carpophilum (Lév.) Jauch (*C. beijerinckii* Oud.), bud blight. Calif. ?Conidial stage of *Ascospora beijerinckii* Vuill.

Tranzschelia discolor (Fckl.) Tranz. & Litv. (II,III), rust. Ga., Tex.

Valsa leucostoma Pers. ex Fr., dieback. Ga.

Prunus persica (L.) Batsch (*Amygdalus persica* L.), peach.

Exotic small tree grown extensively in range 1,2,3,5,6,7.8,10,19,20,22 for the thick-fleshed fruit familiar to all. There are many ornamental varieties; also hybrids with the almond.

Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Central States.

A. tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. General; Iowa, Tex.
Armillaria mellea Vahl ex Fr., mushroom root rot. Cosmopolitan.
Ascospora beijerinckii Vuill.: See *Coryneum carpophilum.*
Aspergillus niger v. Tiegh., black mold, fruit rot. Cosmopolitan.
Botryosphaeria ribis Gross. & Dug. var. *chromogena* Shear, N.E.Stevens, & M.S.Wilcox, branch canker, fruit rot. Fla., Ga.
Botrytis cinerea Pers. ex Fr., gray mold, fruit rot. Cosmopolitan.
Caryospora putaminum (Schw.) de N., on pits. Widespread.
Cephalothecium roseum Cda., pink-mold fruit rot. Widespread.
Cercospora circumscissa Sacc., shot hole. General; Iowa, Tex. Its presence questioned.
C. consobrina Ell. & Ev., leaf spot. Ill., La.
Cercosporella persica Sacc.: See *Mycosphaerella persica.*
Choanephora persicaria Eddy, fruit rot. N.Y. (market).
Cladosporium carpophilum Thuem., scab. General.
Clasterosporium carpophilum (Lév.) Aderh.: See *Coryneum carpophilum.*
Clitocybe monadelpha (Morgan) Sacc., root rot. Ark., Fla., Mo., Okla.
C. parasitica Wilcox, root rot. Okla.
C. tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Commandra pallida DC., on roots. Wash.
Coniothyrium sp., twig blight. Tex.
C. fuckelii Sacc., branch canker. W.Va.
Cornularia persicae (Schw.) Sacc., on branches. Central and Southern States.
Coryneum carpophilum (Lév.) Jauch (*C. beijerinckii* Oud.), blight, winter blight, pustular spot, shot hole. General, especially in the Western States. ?Conidial stage of *Ascospora beijerinckii* Vuill. Zeller says that he has seen the ascospore stage associated with "peach blight lesions" in Oreg.
Cyphella marginata McAlp., twig blight. Oreg.
Cytospora cincta Sacc.: See *Valsa cincta.*
C. leucostoma Sacc.: See *Valsa leucostoma.*
Cytospora persicae Schw., on twigs and branches. Conn. and N.Y. to S.C., Miss., and Ariz.
Diplodia natalensis P.Evans, gumming disease. Ala., Fla., Tex. Pycnidial stage of *Physalospora rhodina* (Berk. & Curt.) Cke.
D. persicina Grove, on branches. La., Pa.
Fabraea maculata Atk. (*Entomosporium maculatum* Lév.), leaf blight. Calif., N.J.
Fomes applanatus (Pers. ex Fr.) Gill., white-mottled rot. Conn., N.J.
F. connatus (Weinm. ex Fr.) Gill., white spongy rot. Conn.
F. pinicola (Sw. ex Fr.) Cke., brown crumbly rot. N.C., Oreg.
F. roseus (Fr.) Cke., brown pocket rot. Oreg., W.Va.
F. subroseus (Weir) Overh., heart rot. Oreg.
Fumago vagans Pers., sooty mold. Cosmopolitan.
Fusarium spp., *F. avenaceum* (Fr.) Sacc., *F. orthoceras* Appel & Wr., and *F. solani* (Mart.) Appel & Wr., fruit rot, in Calif., Ill., N.C., and Tex.; *F. lateritium* Nees and one or more of the preceding species, bud rot and twig blight, in Calif., Ga., Kans.
Fusicoccum amygdali Del., twig canker. Mass., N.J., N.Y.
F. persicae Ell. & Ev., on twigs, ?dieback. Ga., La., Pa.
Ganoderma curtisii (Berk.) Murr., root rot. N.C., Va.
Gloeodes pomigena (Schw.) Colby, on branches. Ind.
Glomerella cingulata (Ston.) Spauld. & Schrenk, ripe rot, twig blight. Ark., Fla., Ga., Md., N.J., Ohio, Tenn., Tex.
Haplosporella amygdalina Dearn. & Barth.—Kans.
Helminthosporium carpophilum Lév.: See *Ascospora beijerinckii.*
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Lenzites saepiaria Fr., heart rot. Oreg.
Leptothyrium pomi (Mont. & Fr.) Sacc., on twigs. Ind., Wash.
Macrophoma persicina (Berk. & Curt.) Berl. & Vogl., on branches. Mo., Pa.
Meloidogyne spp., root knot nematodes. N.C. to Kans., Fla. to Calif. The common peach nematode in southern U.S. is *Meloidogyne incognita* (Kofoid & White) Chitwood. *M. javanica* (Treub) Chitwood also occurs in that area but is less widely distributed; it attacks "nematode-resistant" varieties, especially Shalil and Yunnan.
Monilinia fructicola (Wint.) Honey, brown rot, twig canker. General.
M. laxa (Aderh. & Ruhl.) Honey, brown rot, twig and blossom blight. Pacific Coast States.
Mycosphaerella persica Higgins & Wolf (*Cercosporella persica* Sacc.), frosty mildew. Widespread.
Nectria cinnabarina (Tode) Fr., twig blight, canker. Ala.
Oidium: See *Podosphaera* and *Sphaerotheca.*
Phoma persicae Sacc., (*Phomopsis* sp.), stem canker, "constriction disease." Eastern and Southern States. Possibly the conidial stage of *Diaporthe perniciosa* March =*D. eres* Nits., as reported in Del. and Ohio.
Phyllosticta circumscissa Cke., leaf spot. Widespread.
P. persicae Sacc., leaf spot. Md., Nebr., Ohio.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., N.Mex., Tex.
Physalospora fusca Stevens, on branches. Southern States.
P. obtusa (Schw.) Cke., branch and trunk canker. Eastern and Southern States.
Phytophthora cactorum (Leb. & Cohn) Schroet., stem canker. Ark., Calif.
P. citrophthora Leonian, crown canker. Calif.
Podosphaera oxyacanthae (DC.) d By., powdery mildew. General.
Polyporus hirsutus Wulf. ex Fr., sapwood rot. Cosmopolitan.
P. lacteus Fr., sapwood rot. N.C.
P. versicolor L. ex Fr., sapwood rot. Cosmopolitan.
Pratylenchus pratensis (De Man) Filip., root nematode. Conn.
Pseudomonas syringae Van Hall, bacterial shoot blight, bacterial gummosis. Calif., Okla., Oreg.
Rhizoctonia solani Kuehn, damping-off. Ark., Conn.
Rhizopus nigricans Ehrenb. ex Fr., fruit rot. Cosmopolitan.
Schizophyllum commune Fr., wound rot. Cosmopolitan.
Sclerotinia sclerotiorum (Lib.) d By., blossom blight, green fruit rot. Calif.
Sclerotium rolfsii Sacc., stem rot of seedlings. Southern States.
Sphaeropsis spp.: See *Haplosporella* and *Physalospora.*
Sphaerotheca pannosa Wallr. ex Lév. var. *persicae* Woron., powdery mildew. General.
Stereum hirsutum Willd. ex Fr., wood rot. Oreg.
S. purpureum (Pers. ex Fr.) Fr., silver leaf. Occasional.
Taphrina deformans (Berk.) Tul., leaf curl. General.
Tranzschelia discolor (Fckl.) Tranz. & Litv. (II,III), rust. General; T.H.
Valsa cincta Fr. and *V. leucostoma* Pers. ex Fr., dieback, perennial twig canker. Widespread, especially in the Eastern and Central States; Okla., Tex.
V. decorticans Fr.—Ga.
Verticillium albo-atrum Reinke & Berth., wilt. Occasional, Northeastern States; Calif., Oreg.
Xanthomonas pruni (E.F.Sm.) Dows., bacterial leaf spot, black spot, bacterial canker. Eastern, Central, and Southern States.
ASTEROID SPOT, STIPPLE SPOT—peach asteroid spot virus (*Marmor astri* Holmes). Okla. and Tex. to southern

Calif.; Colo., Oreg., Utah, Wash.; N.C. on infected nursery stock from Tex.

BUCKSKIN—buckskin virus. Calif. Reported as leaf-casting yellows before identity of virus with sweet cherry buckskin virus was determined. See also leaf-casting yellows and western X-disease.

CALICO—peach calico virus. Idaho, Wash.

GOLDEN-NET—unnamed virus. Colo.

LEAF-CASTING YELLOWS—virus(es). Idaho, Oreg., Wash. Possibly western X-disease virus, q. v. Calif. SEE BUCKSKIN.

LEAF CURL AND SHOT HOLE—virus, possibly western X-disease, q.v. Oreg., Wash.

LINE PATTERN—line pattern virus (*Marmor lineopictum* Cation). Ky., Mich.

LITTLE PEACH—little peach virus (*Chlorogenus persicae* Holmes var. *micropersica* Holmes, Prunus virus 1A K.M.Sm.) from Mich. to Conn., south to N.C., and west to Mo. and Kans.

MOSAIC—peach mosaic virus (*Marmor persicae* Holmes. Prunus virus 5 (Hutchins) K.M.Sm.). Okla. and Tex. to Calif., Utah., and Colo., Standard prune-constricting mosaic virus in Calif. on sprouts from peach rootstocks of affected prune trees. "Mosaic," undetermined or unspecified, may involve other viruses.

MOTTLE—peach mottle virus. Idaho.

NECROTIC LEAF SPOT—necrotic leaf spot virus. Mich.

PHONY DISEASE—phony disease virus (*Nanus mirabilis* Holmes, Prunus virus 3 (Hutchins) K.M. Sm.). Southeastern and Southern States west to Mo. and Tex.

RED SUTURE—red suture virus (*Chlorogenus persicae* Holmes var. *vulgaris* Holmes, Prunus virus 4 (Bennett) K.M.Sm.). Ind., Md., Mich.

RING SPOT—?ring spot virus. Calif., Wash.

ROSETTE—peach rosette virus (*Carpophthora rosettae* Holmes, Prunus virus 2 (McClintock) K.M.Sm.). S.C. to Fla., Miss., and Tenn.; Mich. to Ark. and Okla.

ROSETTE MOSAIC—rosette mosaic virus. Mich., N.Y.

WART, BLISTER—peach wart virus (*Galla verrucae* Blodgett). ?Ariz., Calif., Idaho, Oreg., Wash.

WESTERN X-DISEASE—western X-disease virus. Colo., Idaho, Oreg., Utah, Wash. Possibly same as leaf-casting yellows and buckskin viruses. Relationships to these, as well as to the X-disease virus of eastern States, need clarification.

X-DISEASE, YELLOW RED VIROSIS—X-disease virus (*Carpophthora lacerans* (Holmes) McK.) Conn., Mass., Mich., N.Y., Ohio, Pa. Relationship to western X-disease remains to be determined.

YELLOW BUD MOSAIC, WINTERS PEACH MOSAIC—yellow bud mosaic virus. Calif.

YELLOWS—peach yellows virus (*Chlorogenus persicae* Holmes, Prunus virus 1 (Kunkel) K.M.Sm.). Eastern, Central, and Southeastern States to S.C. and Tex.

"CATFACE"—fruit blemish caused by tarnished plant bug (*Lygus oblineatus* (Say)). Okla.

CHLOROSIS—chiefly iron and magnesium deficiency associated with alkaline soils. Southwestern States, Calif.

GUMMOSIS—various causes, chiefly environmental, as winter injury and bad drainage; also twig- and bark-infecting fungi.

INTERNAL BARK NECROSIS—?manganese toxicity. Ill.

LITTLE LEAF—zinc deficiency. Calif., Colo., Fla., Idaho, Oreg., Wash.

SUTURE SPOT—cause unknown, possibly virus (not the same as red suture). N.Y.

Prunus persica (L.) Batsch var. *nectarina* (Ait.) Maxim. (*Amygdalus persica* L. var. *nectarina* Ait.), nectarine.

Small tree, cultivated mainly in California, fruit smooth and plumlike at maturity.

Ascospora beijerinckii Vuill.: SEE *Coryneum carpophilum.*

Cladosporium carpophilum Thuem., scab. Conn., Del., Ill., N.Y., Pa., Tex.

Coryneum carpophilum (Lév.) Jauch (*C. beijerinckii* Oud.), blight, shot hole. Calif., Oreg., Wash. ?Conidial stage of *Ascospora beijerinckii* Vuill.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Calif.

Monilinia fructicola (Wint.) Honey, brown rot. Conn., N.Y., Tex.

M. laxa (Aderh. & Ruhl.) Honey, brown rot. Calif., Wash.

Podosphaera oxyacanthae (DC.) d By., powdery mildew. Idaho, Wash.

Pseudomonas syringae Van Hall, bacterial canker. Calif.

Sphaerotheca pannosa (Wallr.) Lév., powdery mildew. N.Y., Idaho, Oreg.

Taphrina deformans (Berk.) Tul., leaf curl. Calif., Oreg., Tex., Wash.

Valsa leucostoma Pers. ex Fr., canker. D.C.

Xanthomonas pruni (E.F.Sm.) Dows., bacterial leaf spot, bacterial canker. Okla.

MOSAIC—peach mosaic virus (*Marmor persicae* Holmes, Prunus virus 5 (Hutchins) K.M.Sm.). Colo.

X-DISEASE (YELLOW RED VIROSIS)—X-disease virus (*Carpophthora lacerans* (Holmes) McK.). Reported susceptible.

YELLOWS—peach yellows virus (*Chlorogenus persicae* Holmes, Prunus virus 1 (Kunkel) K.M.Sm.). W.Va.

III. Cerasus, Common or Fascicled Cherries

Prunus avium L., sweet cherry, and *P. mahaleb* L., Mahaleb, or St. Lucie, cherry.

P. avium, a tall tree of Europe and western Asia, cultivated in numerous horticultural varieties in zone 3; also the primitive form, known as Mazzard, is naturalized in range 27 and 28; *P. mahaleb*, a small tree, is also used as an understock and sometimes for ornament.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Calif., Tex.

Alternaria sp., fruit rot. Calif., Idaho, Mich.

A. citri Ell. & Pierce var. *cerasi* Rudolph, leaf spot. Calif.

Armillaria mellea Vahl ex Fr., root rot. Okla., Oreg.

Botrytis cinerea Pers. ex Fr., gray-mold rot. Calif., Pacific Northwest.

Cercospora circumscissa Sacc., leaf spot. Ohio, N.J., Pa., Tex. ?Conidial stage of *Mycosphaerella cerasella*, q.v.

Cladosporium herbarum Fr., fruit rot. Calif. to Wash. and Idaho.

Coccomyces hiemalis Higgins, leaf blight, shot hole, sometimes on fruit. General.

Coryneum carpophilum (Lév.) Jauch, shoot blight, shot hole. Idaho, Oreg., Wash.

Dermatea cerasi Pers. ex Fr., on twigs. Alaska, Oreg.

Dibotryon morbosum (Schw.) Th. & Syd., black knot. Del. to Mich. and N.C., Tex.

Erwinia amylovora (Burr.) Winslow et al., fire blight, chiefly on fruit. Oreg., Wash.

Lambertella ?jasmini Seaver & Whet., fruit rot. Oreg.

L. pruni Whetzel, fruit rot. Oreg.

Monilinia fructicola (Wint.) Honey, brown rot, blossom blight. General.

M. laxa (Aderh. & Ruhl.) Honey, blossom and twig blight, brown rot. Idaho, Oreg., Wash. Most frequent species in Pacific Northwest but *M. fructicola* also occurs.

Mycosphaerella cerasella Aderh., leaf spot. Ga. to Fla. and Miss.
Penicillium expansum Lk. ex Thom, mold of fruit. Pacific Northwest.
Phomopsis padina (Sacc.) Died.—Wash.
Phyllosticta pruni-avium Allesch., leaf spot. Oreg.
P. virginiana (Ell. & Halst.) Ell. & Ev., on ?leaves. Wash.
Phytophthora cactorum (Leb. & Cohn) Schroet. and *P. citrophthora* (R.E. & E.H.Smith) Leonian, collar and trunk canker. Calif.
Podosphaera oxyacanthae (DC.) d By., powdery mildew. Occasional; Iowa, Pa.; on fruit—Wash.
Polyporus spp. (*P. hirsutus* Wulf. ex Fr., *P. lacteus* Fr., and *P. versicolor* L. ex Fr.), heart rot. Oreg.
Poria ambigua Bres., root and butt rot. Calif.
Pratylenchus sp., root nematode. Oreg.
Pseudomonas syringae Van Hall, bacterial canker, bacterial shoot blight, gummosis. Mass. to Mich. and Mo., Pacific Coast States.
Pullularia sp., mold of fruit. Pacific Northwest.
Rhizopus stolonifer (Fr.) Lind, ripe rot. Occasional in market fruit.
Schizophyllum commune Fr., sapwood rot. Wash.
Septobasidium retiforme Couch, felt fungus. Ga.
Stereum purpureum (Pers. ex Fr.) Fr.: See SILVER LEAF.
Taphrina cerasi (Fckl.) Sadeb., witches'-broom. N.Y., Pa., Tex., Pacific Northwest.
Tranzschelia pruni-spinosae (Pers.) Diet. (II,III), rust. N.Y., Okla.
Xanthomonas pruni (E.F.Sm.) Dows., bacterial spot, black spot, canker, gummosis. N.Y. to Ga., Tex. and Mich.
Xylaria mali Fromme and *X. longeana* Rehm, root rot. Va.

ALBINO CHERRY—albino virus. Oreg.
BUCKSKIN—buckskin virus; possibly western X-disease virus. Calif., Oreg. *P. mahaleb* is resistant.
CRINKLE LEAF, CRINKLE—viruslike but so far not transmitted. Calif., Idaho, Mont., Oreg., Wash.
DEEP SUTURE—?virus. Mont., Utah, Wash.
MOSAIC—virus. Several types of "mosaic" are reported from Calif. "Cherry mosaic 1" on sweet cherry, said to resemble mottle leaf, q.v.; *P. mahaleb* was experimentally infected with the virus. Another type of mosaic is most apparent on Mazzard rootstocks, mild on orchard varieties; similar symptoms to this were observed in N.Y. Still another mosaic-type virus disease was observed on *P. mahaleb* in Calif. See also MOTTLE LEAF, PRUNE DWARF, RUSTY MOTTLE.
MOTTLE LEAF—cherry mottle leaf virus (*Marmor cerasi* Zeller & Evans, Prunus virus 7 Zeller & Evans). Calif., Idaho, Oreg., Wash.
PEACH NECROTIC LEAF SPOT—necrotic leaf spot virus. Sweet cherry is a symptomless carrier of this virus, discovered in routine indexing of sweet cherry buds on peach trees in Mich.; probably widespread in sweet cherry.
PRUNE DWARF—prune dwarf virus (*Nanus pruni* Holmes, Prunus virus 6 (Thomas & Hildebrand) K.M.Sm.). N.Y.
RASP LEAF (leaf enation, ruffled leaf, cockscomb)—rasp leaf virus. Calif., Colo., Idaho, Mont., Wash.
RUSTY MOTTLE—rusty mottle virus (*Marmor rubiginosum* Reeves). Oreg., Utah, Wash.
TATTER LEAF—tatter leaf virus. N.Y., Pa.
TWISTED LEAF—twisted leaf virus. Wash.
VEIN-CLEARING—vein-clearing virus (*Marmor nerviclarens* Zeller & Evans. Prunus virus 8 Zeller & Evans). ?Calif., Oreg., Wash.
WESTERN X-DISEASE, WILT, DECLINE, WESTERN X, LITTLE CHERRY—western X-disease virus. Colo., Idaho, Oreg., Utah, Wash. Perhaps buckskin in Calif. is the same.
CHLOROSIS—alkali injury. Calif., Tex.
LITTLE LEAF—zinc deficiency. Calif., Oreg., Wash.
SILVER LEAF—Mont. Probably *Stereum purpureum* (Pers. ex Fr.) Fr.

Prunus besseyi Bailey: See *P. pumila*, page 398.

Prunus cerasus L., sour cherry, including var. *austera* L., Morello cherry.

Tree of southeastern Europe and western Asia, cultivated for fruit and for ornament in numerous varieties; hardy in zone 3, also naturalized in range 22,25,27.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Calif., Wash.
Alternaria sp., fruit rot. Mich.
Botrytis cinerea Pers. ex Fr., gray mold of fruit. Occasional.
Cercospora circumscissa Sacc., leaf spot. N.J., Tex.
Cladosporium carpophilum Thuem., scab, fruit crack. Iowa, N.J., N.Y. On cherry probably should be *Fusicladium cerasi*, q.v.
Coccomyces hiemalis Higgins (*Cylindrosporium hiemalis* Higgins), leaf spot, shot hole. General. Sometimes present on fruit.
Coryneum carpophilum (Lév.) Jauch, leaf blight. Calif., Idaho, Wash.
Dermatea cerasi Pers. ex Fr., on branches. N.J., N.Y.
Diaporthe decorticans (Lib.) Sacc. & Roum., on branches, ?canker.
Dibotryon morbosum (Schw.) Th. & Syd., black knot. Eastern States.
Fusicladium cerasi (Rab.) Sacc., scab. N.Y. to Iowa and Wis. Conidial stage of *Venturia cerasi* Aderh., authentic records of the occurrence of which are not available in the U.S. See also *Cladosporium carpophilum*.
Glomerella cingulata (Ston.) Spauld. & Schrenk, fruit rot. Ind.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md.
Monilinia fructicola (Wint.) Honey, brown rot. General; Ga.
M. laxa (Aderh. & Ruhl.) Honey, blossom blight, brown rot. Mich., Oreg., Wash., Wis.
M. seaveri (Rehm) Honey, fruit rot. Ark.
Mycosphaerella cerasella Aderh. (*Cercospora cerasella* Sacc.), leaf spot. Va. to Fla. and Miss.
Pestalotia adusta Ell. & Ev., on leaves (secondary). N.Y.
Phomopsis padina (Sacc. & Roum.) Died., canker, twig blight. N.Y., Pa. Conidial stage of *Diaporthe padi* Otth.
Phyllosticta circumscissa Cke., leaf spot. N.J.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Podosphaera oxyacanthae (DC.) d By., powdery mildew. General.
Pseudomonas syringae Van Hall, bacterial gummosis. Colo., N.Y., Oreg., Wash.
Stereum purpureum (Pers. ex Fr.) Fr., silver leaf. N.Y.
Taphrina cerasi (Fckl.) Sadeb., witches'-broom. Maine to N.J. and Minn.
Tranzschelia pruni-spinosae (Pers.) Diet. (II,III), rust. N.C.
Venturia cerasi Aderh.: See *Fusicladium cerasi*.
Xanthomonas pruni (E.F.Sm.) Dows., bacterial leaf spot, black spot. N.Y. to Mo., Iowa, Nebr.
Xylaria sp., root rot. Tenn.

ALBINO CHERRY—albino virus. Oreg. on Montmorency variety.
GREEN RING MOTTLE—green ring mottle virus. Mich., N.Y., Wis.

MOSAIC—virus. Mosaic due to unspecified or undetermined viruses. Calif., Wash.
NECROTIC RING SPOT—necrotic ring spot virus. Mich., N.Y., Pa., Wis.
PINK FRUIT (bitter fruit)—pink fruit virus. Wash.; similar disease in Idaho. Relationship to buckskin and western X-disease viruses needs to be determined.
RING SPOT—ring spot virus. N.Y.; probably widespread. ?Confused with necrotic ring spot.
SOUR CHERRY YELLOWS (yellow leaf, drop leaf, physiological yellow leaf)—sour cherry yellows virus (or viruses). Mich., N.C., N.Y., Pa., Wis. (on Montmorency, Early Richmond, and English Morello).
TWISTED LEAF—twisted leaf virus. Wash.
WESTERN X-DISEASE, DECLINE, WILT, WESTERN X LITTLE CHERRY—western X-disease virus. Northwest.
X-DISEASE, YELLOW RED VIROSIS—X-disease virus (*Carpophthora lacerans* (Holmes) McK.) N.Y. (on Montmorency and English Morello).
BROWN BARK SPOT—cause unknown, ?arsenical poisoning. Idaho, Mont., Wash.
LITTLE LEAF—zinc deficiency. Only on Montmorency on Mazzard roots.
PITHY CHERRY—?boron deficiency. N.Y. (on Montmorency.)

Prunus cerasus var. *austera* L.: See *P. cerasus*, page 397.

Prunus emarginata (Dougl.) Walp.: See *P. pensylvanica*, below.

Prunus mahaleb L.: See *P. avium*, page 396.

Prunus pensylvanica L. f., wild red, or pin cherry, and *P. emarginata* (Dougl.) Walp., bitter cherry.

Small trees: *P. pensylvanica* of range 13,15, 18,21,23,24,26,27; *P. emarginata* of range 1,2,4, 6,8,9,10,11,12,13,14; both sometimes cultivated for ornament or food for wildlife.

Armillaria mellea Vahl ex Fr., root rot. Wash.
Cercospora circumscissa Sacc., leaf spot. Wis.
Coccomyces hiemalis Higgins (*Cylindrosporium hiemalis* Higgins), leaf spot. Widespread on *P. pensylvanica*.
C. lutescens Higgins—Mont., Wash. (on *P. emarginata*).
Coryneum carpophilum (Lév.) Jauch, leaf spot. Idaho.
Dermatea cerasi Pers. ex Fr., on branches. Widespread.
Dibotryon morbosum (Schw.) Th. & Syd., black knot. Widespread.
Fomes fulvus (Scop. ex Fr.) Gill., brown heart rot. Tenn.
Mycosphaerella nigerristigma Higgins, on leaves. Ga., Miss.
Nectria sp., branch and trunk canker. New England States. (=*N. galligena* Bres.).
N. cinnabarina Tode ex Fr., coral spot, dieback. N.C., Tenn., Wash.
Phyllosticta congesta Heald & Wolf, leaf spot. Wis.
P. prunicola (Op.) Sacc.—Iowa.
P. virginiana (Ell. & Halst.) Ell. & Ev.—Maine.
Podosphaera oxyacanthae (DC.) d By. and var. *tridactyla* (Wallr.) Salm., powdery mildew. Ill., Pa., Wash., Wis.
Taphrina sp., pockets. N.Dak., Vt., Wash.
T. cerasi (Fckl.) Sadeb., witches'-broom. N.H.
T. flectans Mix, witches'-broom. Calif., Oreg., Wash. (on *P. emarginata*).
T. insititiae (Sadeb.) Johans., witches'-broom. Maine to Wis., also Colo.
Tranzschelia pruni-spinosae (Pers.) Diet. (II,III), rust. Ill., Iowa, Wis.
MOTTLE LEAF—virus (*Marmor cerasi* Zeller & Evans, Prunus virus 7 Zeller & Evans). Oreg., Wash.
TATTER LEAF—tatter leaf virus. N.Y.
YELLOWS—sour cherry yellows virus (or viruses). Wis.

Prunus pumila L., sand cherry, and *P. besseyi* Bailey, western sand cherry.

P. pumila an upright shrub of range 15,18,21, 23,24,26,27,28; *P. besseyi* a small bush in range 15,16,18,19,23, cultivated for fruit, as dwarf stock, and used in hybridizing with plums, zone 3.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Minn.
Cercospora circumscissa Sacc., leaf spot. Del.
Coccomyces hiemalis Higgins, leaf spot. Wis.
Coryneum carpophilum (Lév.) Jauch, leaf blight. Wash.
Dibotryon morbosum (Schw.) Th. & Syd., black knot N.Dak., Wis.
Monilinia fructicola (Wint.) Honey, brown rot, twig blight. General; Pa., S.Dak., Wash.
Podosphaera oxyacanthae (DC.) d By., powdery mildew. North Central States.
Taphrina communis (Sadeb.) Gies. (*T. mirabilis* (Atk.) Gies.), pockets, leaf curl. N.Y. to Kans. and N.Dak. *T. mirabilis* reported in Nebr. on *P. besseyi* but probably is not this species.
T. farlowii Sadeb., pockets, hypertrophy of fruit, leaf, and shoot. N.Y.
T. flavorubra Ray, pockets, shoot hypertrophy. Maine to Kans. and Oreg. On *P. pumila* var. *susquehanae* (Willd.) Jaeg., ?Nebr., Wash.
Tranzschelia discolor (Fckl.) Tranz. & Litv. (*T. pruni-spinosae* (Pers.) Diet. var. *discolor* (E. Fisch.) Dunegan) and *T. pruni-spinosae* (Pers.) Diet. (II, III), rust. Iowa, Kans., Minn., S.Dak., Wis.
SUSCEPTIBILITY TO VIRUSES—susceptibility experimentally demonstrated for both species to the necrotic ring spot virus. For *P. besseyi*—susceptibility to the peach mosaic (*Marmor persiae* Holmes, Prunus virus 5 (Hutchins) K.M.Sm.), western X-disease, and X-disease (*Carpophthora lacerans* (Holmes) McK.) viruses. For *P. pumila*—susceptibility to peach rosette (*Carpophthora rosettae* Holmes, Prunus virus 2 (McClintock) K.M.Sm.) and ring spot viruses.

Prunus sargentii Rehd.: See *P. serrulata*, following.

Prunus serrulata Lindl., Oriental cherry.

Large tree of eastern Asia, cultivated in many varieties for ornament. Other species of flowering cherries included here are: *P. sargentii* Rehd., *P. sieboldii* (Carr.) Wittm., Japanese flowering cherry, *P. subhirtella* Miq., Higan cherry, and *P. yedoensis* Matsum., Yoshino cherry; all of Japan and cultivated in numerous varieties.

Botryosphaeria ribis Gross. & Dug., ?canker, dieback. Ga.
Catenophora pruni Luttrell, on twigs. N.C.
Cladosporium carpophilum Thuem., scab. Miss.
Coccomyces hiemalis Higgins, leaf spot. Mass., N.J.
Erwinia amylovora (Burr.) Winslow et al., fire blight. Ga., Ohio.
Polyporus berkeleyi Fr., butt rot. Pa.
P. spraguei Berk. & Curt., butt rot. Pa.
Taphrina cerasi (Fckl.) Sadeb., witches'-broom. Md., N.J.
Xanthomonas pruni (E.F.Sm.) Dows., bacterial spot. N.Y.
ROUGH BARK—virus (*Rimocortius kwanzani* Milbrath & Zeller, Prunus virus 9 Milbrath & Zeller). Oreg. Limited to Kwanzan variety.

VEIN-CLEARING—virus (*Marmor nerviclarens* Zeller & Evans, Prunus virus 8 Zeller & Evans). Oreg.

Prunus sieboldii (Carr.) Wittm.: See *P. serrulata*, page 398.

Prunus subhirtella Miq.: See *P. serrulata*, page 398.

Prunus yedoensis Matsum.: See *P. serrulata*, page 398.

IV. Padus, Racemose Cherries

Prunus caroliniana (Mill.) Ait.: See *P. laurocerasus*, below.

Prunus demissa (Nutt.) Walp.: See *P. virginiana*, this page.

Prunus ilicifolia (Nutt.) Walp.: See *P. laurocerasus*, following.

Prunus laurocerasus L. (*Laurocerasus officinalis* Roem.), English cherry-laurel, and *P. lusitanica* L., Portugal-laurel.

Evergreen shrubs or small trees of Europe and Asia Minor, cultivated for ornament, zone 6 and 7. Also included here are: *P. caroliniana* (Mill.) Ait., Carolina cherry-laurel, mock-orange, of range 20,29,30; *P. ilicifolia* (Nutt.) Walp., holly-leaved cherry, islay, of range 1,3, 4,5; and *P. lyonii* (Eastw.) Sarg., Catalina cherry, of range 5.

Alternaria sp., leaf spot. Tex.
Auerswaldiella puccinioides (Speg.) Th. & Syd.—Ga. (on *P. caroliniana*).
Cercospora circumscissa Sacc., leaf spot. Calif.
C. cladosporioides Sacc., leaf spot. La., Tex.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Coccomyces lutescens Higgins, leaf spot. Miss.
Monilinia fructicola (Wint.) Honey and *M. laxa* (Aderh. & Ruhl.) Honey, blossom blight, brown rot. Calif.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla.
Phyllachora beaumontii (Berk. & Curt.) Cke., leaf spot. Ala.
Phyllosticta laurocerasi Sacc. & Speg., leaf spot. Calif., Fla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Septoria ravenelii Thuem., leaf spot. S.C.
Sphaceloma sp., anthracnose. Calif. (on *P. ilicifolia*).
Taphrina thomasi Mix, witches'-broom. Calif. (on *P. ilicifolia*).
Verticillium albo-atrum Reinke & Berth., wilt. Calif.
Xanthomonas pruni (E.F.Sm.) Dows., bacterial spot. Ga., Miss., N.J., S.C.

Prunus lusitanica L.: See *P. laurocerasus*, above.

Prunus lyonii (Eastw.) Sarg.: See *P. laurocerasus*, above.

Prunus melanocarpa (A. Nels.) Rydb.: See *P. virginiana*, this page.

Prunus padus L.: See *P. serotina*, following.

Prunus serotina Ehrh., black cherry.

A large tree of range 11,18,19,20,21,22,23,24, 25,26,27,28,29,30; cultivated for ornament and fruit, zone 3. A few records on *P. serotina* var. *salicifolia* (Kunth) Koehne of Mexico and southward, cultivated in zone 6, and on *P. padus* L., European bird cherry, cultivated for ornament in zone 3, are included.

Armillaria mellea Vahl ex Fr., root rot. N.H.
Cercospora graphioides Ell., leaf spot. Iowa, Wis.
Coccomyces lutescens Higgins (*Cylindrosporium lutescens* Higgins), leaf spot. Widespread; Ark., Iowa.
Coniophora puteana (Schum. ex Fr.) Karst., butt rot. Pa.
Dermatea cerasi Pers. ex Fr., on branches. N.Y.
Diaporthe pennsylvanica (Berk. & Curt.) Wehm., on branches. N.Y.
D. pruni Ell. & Ev., twig canker. Iowa, Mass., Mich., N.Y.
D. tuberculosa (Ell.) Sacc. var. *pruni* Dearn. & House —N.Y.
Dibotryon morbosum (Schw.) Th. & Syd., black knot. Widespread; Ga.
Dothichiza serotina Atk., on leaves. Ala., W.Va.
Fomes fomentarius (L. ex Fr.) Kickx and *F. pinicola* (Sw. ex Fr.) Cke., trunk rot. New England States. *F. pinicola* causes top rot of trunks in Pa., Va.
Monilinia fructicola (Wint.) Honey, brown rot. Widespread.
M. seaveri (Rehm) Honey (*Monilia seaveri* Reade), twig blight, seedling blight. Eastern States to Ark. and Iowa.
Mycosphaerella cerasella Aderh., leaf spot. N.Y.
Nectria sp., canker. New England States, N.Y. (=*N. galligena* Bres.).
Pestalotia adusta Ell. & Ev., on leaves. N.Y., Va.
Pezizella oenotherae (Cke. & Ell.) Sacc., on twigs. Va.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Southern States.
Phyllosticta serotina Cke., leaf spot. Widespread.
P. prunicola Sacc., scurfy bark. Iowa.
P. virginiana (Ell. & Halst.) Ell. & Ev.—Iowa, Kans.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke.—Ga.
Podosphaera oxyacanthae (DC.) d By., powdery mildew. N.Y. to Mich. and Nebr.
Polyporus spp., especially *P. albellus* Pk., *P. dryophilus* Berk., *P. hirsutus* Wulf. ex Fr., and *P. versicolor* L. ex Fr., sapwood and heart rot. Widespread.
P. sulphureus Bull. ex Fr., trunk rot. Pa.; widespread.
Poria spp., especially *P. inflata* Overh. and *P. mutans* Pk., trunk rot of mature trees. Pa. (Alleghany Forest).
P. prunicola (Murr.) Sacc. & Trott., red-mottled heart rot. Maine, N.Y.; trunk rot of mature trees—Pa. (Alleghany Forest).
P. sericeo-mollis (Rom.) Baxter, brown heart rot. Mich., Pa.; trunk rot of mature trees—Pa. (Alleghany Forest).
Stereum rameale Schw., trunk rot. N.Y., Pa.
Taphrina farlowii Sadeb. (*T. varia* (Atk.) Mix), hypertrophy of fruit, leaves, and shoot. Vt. to Fla., Tex., Ark., and Kans.
Tranzschelia arthurii Tranz. & Litv. (II,III), rust. Described from specimens from Iowa and Mich.; perhaps more widespread. (Cf. Russian Jour. Bot. 24:250. 1939).
T. pruni-spinosae (Pers.) Diet. (II,III), rust. Mass. to Ga., Tex., and Nebr.
Valsa exasperans (Ger.) Sacc.—Ga.
V. leucostoma Pers. ex Fr., twig canker, dieback. Widespread; Ga.

Prunus virginiana L., common chokecherry.

Shrub or small tree of range 21,22,23,24,25, 26,27,28,29,30; including the western chokecherries, *P. virginiana* var. *demissa* (Torr. & Gray) Torr. of the Pacific coast, and var. *melanocarpa* (A. Nels.) Sarg. of the Great Plains and Rocky Mountain States.

Cercospora circumscissa Sacc., shot hole, leaf spot. New

England States; Iowa, Wis.; N.Dak to Kans. and Mont.

Coccomyces lutescens Higgins (*Cylindrosporium lutescens* Higgins), shot hole, leaf spot. General.

Cylindrosporium nuttalli (Harkn.) Dearn. (*?C. lutescens*), leaf spot. Oreg. (on var. *demissa*).

Cytospora chrysosperma Pers. ex. Fr., on twigs, ?canker. Mont.

Dermatea cerasi Pers. ex Fr., on branches. Mass., N. Dak.

Dibotryon morbosum (Schw.) Th. & Syd., black knot. General.

Fomes fulvus (Scop. ex Fr.) Gill., brown heart rot. N.Dak., S.Dak.

Gloeosporium prunicola Ell. & Ev., leaf spot. N.Y., Wis.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Lophodermina prunicola Tehon, tar spot. Colo., on var. *melanocarpa.*

Melanconium cerasinum Pk., on branches. Kans., N.Dak.

Meloidogyne sp., root knot nematodes.

Monilia angustior (Sacc.) Reade, shoot and fruit blight. Vt. to Kans. and N.Dak. Conidial stage of *Sclerotinia angustior* Reade (=*?Monilina padi* (Woron.) Honey).

Monilinia demissa (Dana) Honey, shoot and fruit blight. Idaho, Wash. (on var. *demissa*). Distinction from preceding doubtful, especially on var. *melanocarpa* in N.Dak., Idaho, and Utah. Reports of *M. fructicola* (Wint.) Honey and *M. seaveri* (Rehm) Honey on these hosts are doubtful.

Mycosphaerella cerasella Aderh. (*Cercospora cerasella* Sacc.), leaf spot. Kans.

Myxosporium pruni (Pk.) Dearn. & House, on branches. N.Y.

Nectria cinnabarina Tode ex Fr., on branches, often following black knot. Widespread.

Phoma virginiana Ell. & Halst.—Iowa.

Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Wash.

Phyllosticta circumscissa Cke., leaf spot. Kans., Wash.

P. destruens Desm., on leaves, ?leaf spot. Iowa, N.Y.

P. serotina Cke.—Nebr., Pa., S.C.

P. virginiana (Ell. & Halst.) Ell. & Ev., leaf blotch. N.Y. to Kans. and Mont. Has been reported as *P. destruens* Desm. and *P. prunicola* Sacc.

P. vulgaris Desm.—Iowa.

Physalospora obtusa (Schw.) Cke., on branches. Kans. N.Y.

Podosphaera oxyacanthae (DC.) d By., powdery mildew. Widespread; on var. *demissa* in Wash.

Sclerotinia angustior Reade (*?Monilinia padi* (Woron.) Honey): See *Monilia angustior.*

S. demissa Dana: See *Monilinia demissa.*

Septoria pruni Pk., leaf spot. Mich.

Taphrina confusa (Atk.) Gies. (*T. unilateralis* (Pk.) Mix), hypertrophy of leaf, fruit, and shoot. New England States to Wis., also in Western States. Various *Taphrina* spp. reported on these hosts, including *T. cecidimophila* (Atk.) Gies., on fruit galls, probably belong here.

Tranzschelia pruni-spinosae (Pers.) Diet. (II,III), rust. Conn. to Ill. and Wis.; Fla.

Valsa cincta Fr. and *V. leucostoma* Pers. ex Fr., on branches. Kans., Mont., N.Dak.

TATTER LEAF—?tatter leaf virus. N.Y.

WESTERN X-DISEASE—western X-disease virus. Idaho, Oreg., Utah, Wash.

X-DISEASE, YELLOW RED VIROSIS—X-disease virus (*Carpopthora lacerans* (Holmes) McK.) N.H. to Va., Ill., and Wis.

Susceptibility demonstrated to the buckskin and sour cherry yellows viruses.

Prunus virginiana var. *demissa* (Torr. & Gray) Torr.: See *P. virginiana,* page 399.

P. virginiana var. *melanocarpa* (A. Nels.) Sarg.: See *P. virginiana,* page 399.

V. Various or Undetermined or Unspecified *Prunus* spp.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Widespread.

Armillaria mellea Vahl ex Fr., root rot. Cosmopolitan. Most serious disease of stone fruits in Calif. on prunes, apricots, cherries, peaches, almonds, and plums. (Plant Dis. Rptr. 29:495).

Botrytis cinerea Pers. ex Fr., blossom blight, green and ripe fruit rot, gummosis. Cosmopolitan.

Cercospora cerasella Sacc., leaf spot. Conidial stage of *Mycosphaerella cerasella,* q.v.

C. circumscissa Sacc., leaf spot, shot hole. Widespread. Perhaps a synonym of the preceding.

Cladosporium carpophilum Thuem., scab, usually of fruit, sometimes of foliage and twigs. Widespread on *Prunus* spp. other than *P. cerasus.*

Clasterosporium carpophilum (Lév.) Aderh.: See *Coryneum carpophilum.*

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.

Coccomyces hiemalis Higgins (*Cylindrosporium hiemalis* Higgins), leaf spot, shot hole. General, chiefly on *P. avium, P. cerasus,* and *P. pensylvanica.* This and the following two species have been placed in a new genus, *Higginsia,* by Nannfeldt, and the conidial stage is said to be related more closely to *Marssonina* than to *Cylindrosporium.*

C. lutescens Higgins (*Cylindrosporium lutescens* Higgins), leaf spot. Widespread, chiefly on *P. mahaleb, P. serotina,* and *P. virginiana.*

C. prunophorae Higgins (*Cylindrosporium prunophorae* Higgins), leaf spot, shot hole. Widespread, chiefly on *P. americana, P. domestica,* and *P. salicina.*

Cornularia persicae (Schw.) Sacc., on branches. N.C., N.Y., Va., Vt.

Corticium stevensii Burt: See *Pellicularia koleroga.*

Coryneum carpophilum (Lév.) Jauch (*C. beijerinckii* Oud.), blight, gummosis, pustular spot. Widespread, especially in Pacific Coast States.

Cylindrosporium spp., especially *C. padi* Amer. Auct. Conidial stages of *Coccomyces* spp., q. v.

Cytospora cincta Sacc., and *C. leucostoma* Sacc., dieback, twig canker. Conidial stages, respectively, of *Valsa cincta* and *V. leucostoma,* q. v. Other *Cytospora* spp. reported but probably saprophytic.

Daedalea confragosa Bolt. ex Fr. and *D. unicolor* Bull. ex Fr., wood rot. Occasional.

Dermatea cerasi Pers. ex Fr. (*Micropera drupacearum* Lév.), on branches. Widespread. *D. prunastri* Fr. (*Sphaeronema spurium* Sacc.), frequently reported, is probably a synonym.

Diaporthe spp., on branches, ?canker. Species reported include: *D. eres* Nits. on *Prunus* spp.; *D. decorticans* (Lib.) Sacc. & Roum. on *P. cerasus; D. pennsylvanica* (Berk. & Curt.) Wehm. on *P. pensylvanica* and *P. virginiana; D. pruni* Ell. & Ev. on *P. serotina* and *P. virginiana;* and *D. prunicola* (Pk.) Wehm. on *P. pensylvanica* and *P. serotina.*

Dibotryon morbosum (Schw.) Th. & Syd., black knot. General.

Erwinia amylovora (Burr.) Winslow et al., twig blight. Occasional on various *Prunus* spp., especially *P. armeniaca;* sometimes also on *P. avium* and *P. domestica,* chiefly on the fruit.

Exoascus spp.: See *Taphrina.*

Fomes spp., wood rot, sometimes butt and heart rot of living trees. Species reported include: *F. annosus* (Fr.) Cke.—New England States; *F. applanatus* (Pers. ex Fr.) Gill., white butt and heart rot—Oreg.; *F. fomentarius* (L. ex Fr.) Kickx—New

England States; *F. fraxinophilus* (Pk.) Sacc.—Oreg.; *F. fulvus* (Scop. ex Fr.) Gill. (*F. pomaceus* Pers. ex Lloyd), brown cubical heart rot—Widespread; *F. igniarius* (L. ex Fr.) Kickx, white spongy rot, often following black knot—Idaho, Mont.; *F. marmoratus* Berk.—S.C.; *F. pinicola* (Sw. ex Fr.) Cke., brown crumbly rot—Widespread; *F. roseus* (Alb. & Schw. ex Fr.) Cke.—Oreg.; *F. subroseus* (Weir) Overh., brown cubical heart rot—Pacific Coast States.

Fusicladium cerasi (Rab.) Sacc., scab. Reported on *P. americana* but this should probably be *Cladosporium carpophilum*, q. v.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Lenzites spp., brown sapwood rot or sometimes heart rot of living trees. Species reported include: *L. betulina* L. ex Fr.—Mich. and N.Y.; *L. saepiaria* Wulf. ex Fr. and *L. trabea* Pers. ex Fr.—Idaho, Oreg., and Wash.

Leptothyrium pomi (Mont. & Fr.) Sacc., flyspeck on fruit. Eastern and Central States.

Massaria conspurcata (Wallr.) Sacc., on dead branches. Widespread.

Meloidogyne spp., root knot nematodes. Southern States, Ariz., Okla.

Micropera drupacearum Lév.: SEE *Dermatea cerasi*.

Monilia spp., brown rot, blossom and twig blight. Conidial stages of *Monilinia* (*Sclerotinia*) spp.

Monilinia fructicola (Wint.) Honey, brown rot, blossom blight. General on all cultivated and various native *Prunus* spp.

M. laxa (Aderh. & Ruhl.) Honey, blossom and twig blight, brown rot. On cultivated *Prunus* spp. in Pacific Coast States, Wis.

Mycosphaerella cerasella Aderh. (*Cerocospora cerasella* Sacc.), leaf spot. Eastern and Southern States to Kans.

Nectria cinnabarina Tode ex Fr., coral spot, dieback. Widespread.

Pellicularia koleroga Cke., thread blight. Fla.

Penicillium spp., blue-mold rot. On prunes and cherries. Pacific Northwest.

Phomopsis mali Roberts, bark canker. Va. Conidial stage of *?Diaporthe eres*.

Phoradendron flavescens (Pursh) Nutt., mistletoe. On various *Prunus* spp. in Central and Southern States.

P. flavescens var. *macrophyllum* Engelm.—Ariz.

Phyllosticta circumscissa Cke. (*?P. persicae* Sacc.), leaf spot, shot hole. Widespread.

P. congesta Heald & Wolf, leaf blotch. Ill., Tex., Wis.

P. serotina Cke., leaf spot. N.J. to Ala and Wis.

P. virginiana (Ell. & Halst.) Ell. & Ev., leaf spot. Iowa to Kans. and Mont.

Phymatotrichum omnivorum (Shear) Dug., root rot. On all tested *Prunus* spp., Ariz., Okla., Tex.

Physalospora spp., on branches. Species reported include: *P. fusca* N.E.Stevens—S.C.; *P. obtusa* (Schw.) Cke.—Widespread; *P. rhodina* (Berk. & Curt.) Cke.—S.C.

Phytophthora cactorum (Leb. & Cohn) Schroet., collar rot. Calif., Ind.

P. citrophthora (R.E. & E.H.Sm.) Leonian, trunk canker. Calif

Plowrightia morbosa (Schw.) Sacc.: SEE *Dibotryon morbosum*.

Podosphaera oxyacanthae (DC.) d By., powdery mildew. General. Var. *tridactyla* (Wallr.) Salm., often reported but confirmed only in the Pacific Northwest.

Polyporus spp., wood rot, sometimes root, butt, or heart rot of living trees. Species reported include: *P. cinnabarinus* Jacq. ex Fr.—Widespread; *P. dryophilus* Berk. (*P. rheades* Pers. ex Fr.)—Maine, Mich.; *P. galactinus* Berk.—N.Y., Oreg.; *P. gilvus* (Schw.) Fr., white sap and heart rot—Widespread; *P. hirsutus* Wulf. ex Fr.,white spongy sap rot—Widespread; *P. lacteus* Fr., white heart rot—Widespread; *P. pargamenus* Fr., white sap rot—Widespread; *P. sulphureus* Bull. ex Fr., brown butt and heart rot—New England States; *P. supinus* Sw. ex Fr.—Southern States; *P. tulipiferus* Schw. ex Overh.—New England States; and *P. versicolor* L. ex Fr., white spongy sap rot, heart rot—Widespread.

Poria spp., white spongy rot of dead wood, sometimes root and heart rot of living trees, especially *P. ambigua* Bres., root rot—Calif.; *P. prunicola* (Murr.) Sacc. & Trott., *P. pulchella* (Schw.) Cke., *P. vaporaria* (Fr.) Cke., and *P. versipora* Pers. ex Rom., chiefly on *P. serotina*—North Central and Eastern States.

Pseudomonas syringae Van Hall, canker, gummosis. Especially on *P. avium*. Pacific Coast States and occasionally in the East.

Schizophyllum commune Fr., wood rot, sometimes on living trees. Cosmopolitan.

Sclerotinia spp.: SEE *Monilinia*.

Sclerotinia sclerotiorum (Lib.) d By., green rot, shoot blight. Calif.

Septobasidium burtii Lloyd, felt fungus on branches infested by scale insects. S.C. to La.

Septoria cerasina Pk.: SEE *Coccomyces lutescens*.

Septoria pruni Ell. and *S. purpureocincta* Ell. & Ev., leaf spot. Kans. on *P. americana*.

Sphaeronema spurium Sacc.: SEE *Micropera drupacearum*.

Sphaeropsis spp., on twigs. Species reported include: *S. cerasina* Pk.—N.Y.; *S. peckii* Sacc.—Kans. and N.Dak.

Stereum spp., wood rot, sometimes wound or heart rot of living trees. Species reported include: *S. hirsutum* Willd. ex Fr.—Widespread; *S. rameale* Schw., top rot—N.Y., Pa.; *S. sericeum* Schw.—N.C., W.Va.

S. purpureum (Pers. ex Fr.) Fr., heart rot, silver leaf. N.Y., Pacific Coast States.

Taphrina communis (Sadeb.) Gies. (*T. decipiens* (Atk.) Gies., *T. longipes* (Atk.) Gies., *T. mirabilis* (Atk.) Gies., *T. rhizipes* (Atk.) Gies.), pockets, bladder plums, sometimes leaf curl. Widespread on *P. americana* and *P. nigra* and other native plums.

Trametes hispida Bagl., wound rot, heart rot. Colo., Oreg., Wyo.

Tranzschelia spp. (II,III), rust. Species reported include:

T. arthurii Tranz. & Litv. on *Prunus serotina*—Iowa, Mich., perhaps elsewhere; O and I are unknown.

T. discolor (Fckl.) Tranz. & Litv. (*T. pruni-spinosae* (Pers.) Diet. var. *discolor* (E. Fisch.) Dunegan) on apricot, peach, cultivated plums, and some native *Prunus* spp., recently distinguished from the following species and reports of this latter may include or refer to this; O and I on *Anemone coronaria* L.

T. pruni-spinosae (Pers.) Diet. (*T. pruni-spinosae* var. *typica* (E. Fisch.) Dunegan) on various native *Prunus* spp., occasionally on cultivated plums—general; O and I on various Ranunculaceae.

Valsa cincta Fr. and *V. leucostoma* Pers. ex Fr. (*Cytospora cincta* Sacc. and *C. leucostoma* Sacc.), dieback, twig canker. Widespread.

Xanthomonas pruni (E.F.Sm.) Dows., bacterial spot, black spot of leaves and fruit, canker. On all cultivated *Prunus* spp., less on native species. Widespread.

Pyracantha

Pyracantha spp.

Large evergreen shrubs: *P. coccinea* Roem., firethorn, of southern Europe to western Asia,

cultivated for ornament, zone 6, locally naturalized in range 27,28,29. The var. *lalandii* Dipp. is hardier and more commonly seen in cultivation. *P. angustifolia* (Franch.) Schneid., *P. crenulata* (Roxb.) Roem., and *P. crenato-serrata* (Hance) Rehd. of central to southwestern Asia are cultivated in the same range.

Armillaria mellea Vahl ex Fr., root rot. Calif.
Botryosphaeria ribis Gross. & Dug., canker. Miss.
Diplodia ?crataegi West. (=*D. sarmentorum* Fr.), twig blight. Pa.
Erwinia amylovora (Burr.) Winslow et al., fire blight. Widespread. Infects all species named but some are relatively resistant.
Fusicladium pyracanthae (Otth) Rostr., scab on leaves and fruit. Widespread. (=*?Venturia inaequalis* (Cke.) Wint. apud Thuem.)
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. Ala.
Septobasidium cokeri Couch and *S. mariani* Bres., on scale insects infesting bark. N.J.

Pyrus

I. *Pyrus* spp., Other Than *P. communis* L. and Its Hybrids

(1) *Pyrus pyrifolia* (Burm.) Nakai (*P. serotina* Rehd., *P. sinensis* Auct.), sand pear.

Chinese tree, sometimes cultivated for fruit, zone 5. *P. lecontei* (*P. pyrifolia* × *P. communis*) furnishes Kieffer, LeConte, and similar varieties.

(2) *Pyrus* spp.

Chiefly Asiatic species of small, deciduous trees, such as *P. betulaefolia* Bunge, *P. calleryana* Decne., *P. salicifolia* Pall., and *P. ussuriensis* Maxim.; grown in the United States for ornament or understocks for pear; hardy in zones 4 or 5.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Md. (2).
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (1).
Corticium stevensii Burt: SEE *Pellicularia koleroga.*
Erwinia amylovora (Burr.) Winslow et al., fire blight. Occasional, Iowa (1); occasional in Ill., N.Y., Va. but usually very resistant (2). One severe attack reported in N.Y. (2).
Fabraea maculata Atk., leaf blight. Iowa, La., Md., Miss., N.Y. (1); Va. (2).
Glomerella cingulata (Ston.) Spauld. & Schrenk, bitter rot. Miss. (1)
Gymnosporangium clavariaeforme (Jacq.) DC. (O.I), rust. Fla. (2).
G. clavipes Cke. & Pk., (O,I), rust. Ark. (1).
G. haraeanum Syd. (O,I), leaf rust. Calif., Oreg. (1). III on *Juniperus chinensis* L.
G. nootkatense (Trel.) Arth. (O,I), leaf rust. Alaska (on *P. betulaeforme*). II and III on *Chamaecyparis nootkatense* (Lamb.) Spach.
Leptosphaeria sp., leaf spot. Fla. (1).
Monilinia fructicola (Wint.) Honey, brown rot. Va. (1).
Mycosphaerella pyrina (Ell. & Ev.) J.H.Miller, on leaves. Ga. (1).
M. sentina (Fr.) Schroet., leaf spot. Kans., Miss., Tex. (1).
Pellicularia koleroga Cke., thread blight. Miss. (1).
Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla. (1).
Physalospora obtusa (Schw.) Cke., black rot. Miss. (1).
Pseudomonas syringae Van Hall, canker. Calif. (1).
Tryblidiella fusca (Ell. & Ev.) Rehm, on dead branch, possibly wound-parasitic. Fla. (1).
Xylaria mali Fromme, root rot. Va. (2).
LEAF-TIP BLIGHT and DIEBACK—Phosphorus deficiency. Colo. (1).

II. *Pyrus* sp., the Common Pear

Pyrus communis L., pear.

Large tree of Europe and western Asia, cultivated for fruit, zone 4. There exist many pomological varieties.

Agrobacterium tumefaciens (E.F.Sm & Town.) Conn. crown gall. General.
Alternaria sp. (*A. mali* Roberts), black-mold rot of fruit, leaf spot. Occasional in the West.
Armillaria mellea Vahl ex. Fr., root rot. Widespread; Tex.
Aspergillus spp., *A. flavus* Lk., *A. pyri* English (=*A. niger* v. Tiegh.), storage rot. Cosmopolitan.
Botryosphaeria ribis Gross. & Dug., black rot of fruit. Va.
Botrytis cinerea Pers. ex Fr., gray mold rot, blossom blight, twig blight. Widespread.
Cephalosporium carpogenum Ruehle, storage rot. Oreg., Wash.
Cephalothecium roseum Cda.: SEE *Trichothecium roseum.*
Cercospora spp., leaf spot. Species reported include: *C. minima* Tracy & Earle—Fla. to Tex.; *C. pyri* Farl.—Mich.
Cladosporium sp. (*C. herbarum* Lk.), green mold rot. Occasional.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. La.
Coniothyrium pirinum (Sacc.) Sheldon, leaf spot. Mass. to Ala., Tex., and Iowa. Possibly identical with *C. tirolense* Bub.
Corticium koleroga (Cke.) Hoehn. and *C. stevensii* Burt: SEE *Pellicularia koleroga.*
Corticium salmonicolor Berk. & Br., twig blight. Fla., La.
Coryneum foliicola Fckl., leaf spot. Ind.
C. microstictum Berk. & Br. and *C. longistipitatum* Berl., on twigs. Fla., N.J.
Cylindrosporium spp., *C. magnusianum* Wr., *C. obtusisporum* (Cke. & Harkn.) Wr., and *C. radicicola* Wr., on branches associated with cankers. Conidial stages of *Nectria* spp.
Cytospora spp., canker. Oreg., Va., Wash.
Diplodia spp., on twigs and branches. Species reported include: *D. maura* Cke. & Ell.—Ala., Kans., N.J.; *D. pryenophora* Fr.—N.J.; *D. sarmentorum* Fr.—Oreg.
Elsinoë piri (Wor.) Jenkins (*Sphaceloma pirinum* Jenkins), anthracnose. Oreg., Wash.
Entomosporium maculatum Lév.: SEE *Fabraea maculata.*
Erwinia amylovora (Burr.) Winslow et al., fire blight. General on *P. communis* vars. but some *communis* × *pyrifolia* hybrids are resistant.
E. carotovora (L.R.Jones) Holland, fruit rot. Mass.
Fabraea maculata Atk., leaf blight, black spot of fruit. General.
Fomes igniarius (L. ex Fr.) Kickx, white heart rot. Occasional.
F. pinicola (Sw. ex Fr.) Cke.
Fusarium spp., twig blight, canker. Occasional. Species reported include: *F. acuminatum* Ell. & Ev., *F. avenaceum* (Fr.) Sacc., *F. lateritium* Nees, and *F. sambucinum* Fckl.
Fusicladium pyrinum (Lib.) Fckl., scab. Conidial stage of *Venturia pyrina*, q. v.

Gloeodes pomigena (Schw.) Colby, sooty blotch. Eastern States to Okla. and Tex.
Gloeosporium sp., fruit rot. Widespread. Conidial stage of *Glomerella cingulata*, q. v.
G. malicorticis Cordley: See *Neofabraea malicorticis.*
G. perennans Zeller & Childs: See *Neofabraea perennans.*
Glomerella cingulata (Ston.) Spauld. & Schrenk, bitter rot of fruit, twig and branch canker. Widespread but not destructive; Tex.
Glutinium microsporum Zeller, bark canker. Oreg.
Gymnosporangium clavariaeforme (Jacq.) DC. (O,I), rust, on leaves and fruit. S.C. III on *Juniperus communis* L.
G. clavipes Cke. & Pk. (O,I), rust, chiefly on fruit. La., Tex. III on *Juniperus communis* and *J. virginiana* L.
G. globosum Farl. (O,I), rust, on leaves and fruit. Eastern States to Iowa and Minn. III on *Juniperus virginiana.*
G. hyalinum (Cke.) Kern (O,I), rust. Fla.
G. kernianum Bethel (O,I), rust, on leaves. Ariz. III on *Juniperus occidentalis* Hook. and *J. pachyphlaea* Torr.
G. libocedri (P.Henn.) Kern (O,I), rust, on leaves and fruit. Calif., Oreg. III on *Libocedrus decurrens* Torr.
G. nelsoni Arth. (O,I), rust, on leaves and fruit. Ariz., Colo. III on *Juniperus* spp.
Helminthosporium sp., black pox. Pa. =?*H. papulosum*, q. v.
H. papulosum Berg, bark canker. Miss.
Hendersonia cydoniae Cke. & Ell., leaf spot. N.Y.
H. foliorum Fckl.—Tex.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
?*Hypoxylon rubiginosum* Pers. ex Fr.—Ga.
Leptothyrium pomi (Mont. & Fr.) Sacc., flyspeck. Eastern States, Tex.
Meloidogyne sp., root knot nematodes. Calif.
Monilinia fructicola (Wint.) Honey, brown rot. Eastern States, Tex., Wash.
M. laxa (Aderh. & Ruhl.) Honey, brown rot, blossom blight. Pacific Coast States.
Mycosphaerella sentina (Fckl.) Schroet. (*Septoria piricola* Desm.), ashy leaf spot, fruit spot. Widespread, chiefly in the East, Iowa, Tex.
M. tulasnei (Jancz.) Lindau—Oreg., Wash.
Myxosporium corticola Edg. (*Cryptosporiopsis corticola* (Edg.) Nannf.), bark canker. N.Y. to Mich. and Miss., also Oreg. Conidial stage of *Pezicula cortícola* (Jørg.) Nannf.
Nectria cinnabarina (Tode ex Fr.), coral spot, dieback. Widespread.
N. galligena Bres., trunk canker. Oreg., Wash.
Neofabraea malicorticis Jacks. (*Pezicula malicorticis* (Jacks.) Nannf.), black-spot canker, fruit rot. Oreg., Wash.
N. perennans Kienh. (*Gloeosporium perennans* Zeller & Childs), perennial canker, fruit rot. Oreg., Wash.
Neurospora sitophila Shear & B.O.Dodge, ripe rot. N.C.
Nummularia discreta (Schw.) Tul., blister canker. Del., Iowa.
Penicillium spp., blue-mold rot. Widespread. Species reported include: *P. chrysitis* Biourge, *P. cyclopium* Westling, *P. expansum* Lk. ex Thom, *P. puberulum* Bainier, *P. roquefortii* Thom, *P. terrestre* C.N.Jens.
Phialophora malorum (Kidd & Beaumont) McColloch, storage rot. Oreg., Wash.
Phoma exigua Desm., storage rot. Wash.
P. mali Schultz & Sacc., fruit rot. N.J., Wash.
Phomopsis ambigua (Sacc.) Trav., twig blight, fruit rot. Widespread. Conidial stage of *Diaporthe ambigua* Nits.=*D. eres* Nits.
P. mali Roberts, bark canker. Calif.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Tex.
P. flavescens var. *macrophyllum* Engelm.—Ariz., N.Mex.
Phyllosticta pirina Sacc.: See *Coniothyrium pirinum.*
Phyllosticta pyrorum Cke., leaf spot. Ill., Miss., S.C.
P. solitaria Ell. & Ev.—Md.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. and Okla. to Ariz.
Physalospora fusca N.E.Stevens—N.J. and Va.
P. obtusa (Schw.) Cke., black rot, leaf spot, canker. Widespread.
P. rhodina (Berk. & Curt.) Cke., on branches. Fla.
Phytophthora cactorum (Leb. & Cohn) Schroet., collar rot, fruit rot. Widespread.
P. citrophthora (R.E. & E.H.Sm.) Leonian, collar rot. Calif.
Pleospora fructicola Ruehle, storage rot. Wash.
Podosphaera leucotricha (Ell. & Ev.) Salm., powdery mildew. Colo., Oreg., Wash.
P. oxyacanthae (DC.) d By.—N.J.
Polyporus spp., trunk rot, sometimes wound rot or heart rot of living trees. Species reported include: *P. gilvus* (Schw.) Fr.—Ind., N.Y.; *P. lacteus* Fr.; *P. squamosus* Huds. ex Fr.; *P. sulphureus* Bull. ex Fr.; *P. versicolor* L. ex Fr.—widespread; *P. zonatus* Fr.—Oreg.
Pratylenchus pratensis (De Man) Filip., in roots, associated with little leaf. Calif.
Pseudomonas syringae Van Hall, blossom and twig blight, canker. Ark., Calif.
Rhizopus nigricans Ehr., black mold rot. Cosmopolitan.
Sclerotinia sclerotiorum (Lib.) d By., fruit rot. Calif., Wash.
Schizophyllum commune Fr., trunk rot, sometimes of living trees. Cosmopolitan.
Septobasidium spp., on scale insects infesting bark. N.C. to Fla. and Tex. Species reported include: *S. burtii* Lloyd, *S. curtisii* (Berk. & Desm.) Boed. & Steinm., *S. pseudopedicellatum* Burt, and *S. retiforme* (Berk. & Curt.) Pat.
Septoria piricola Desm., leaf spot. Conidial stage of *Mycosphaerella sentina*, q. v.
Sphaeropsis malorum Pk. Conidial stage of *Physalospora obtusa*, q. v.
Sporotrichum malorum Kidd & Beaum.: See *Phialophora malorum.*
Stereum hirsutum Wulf. ex Fr., trunk rot. Idaho (reported on *Pyrus* sp.
S. purpureum (Pers. ex Fr.) Fr., heart rot, ?silver leaf. N.Y., Oreg.
Taphrina bullata (Berk. & Br.) Tul.—Wash.
Trichothecium roseum Lk. ex Fr., pink mold rot. Occasional.
Valsa leucostoma Pers. ex Fr., twig blight. Wash.
Venturia pyrina Aderh., scab. General.
Xylaria sp., root rot. Idaho, Ind.
X. mali Fromme, root rot. Va.

Mosaic—undetermined virus. In Hardy variety in Calif. (=?stony pit).
Stony pit—virus (*Marmor pyri* Holmes). Pacific Coast States.
Bitter pit (possibly identical with cork and drought spot)—attributed to deficiency or irregularity of moisture supply during growth. Pacific Coast States, N.Y.
Black end, hard end—associated with use of Oriental pear rootstocks and occurring on shallow, poorly drained soil. Pacific Coast States, N.Y.
Black leaf—undetermined cause; sometimes associated with rough bark. Calif.
Brown bark spot, ?measles—undetermined cause; possibly nutritional deficiency. Pacific Northwest, Fla., Ind.
Brown blotch of fruit (especially of Kieffer variety)—undetermined cause. Eastern States.

CHLOROSIS—mineral deficiency, soil alkalinity. Tex., Pacific Coast States.
CORE BREAKDOWN, BROWN HEART—overmaturity; condition found chiefly in stored fruit.
CORK, DROUGHT SPOT—boron deficiency. Pacific Coast States, Tex.
EXANTHEMA—copper deficiency. Calif., Fla.
LITTLE LEAF, ROSETTE—nutritional deficiency, ?zinc or boron. Calif., Wash. Sometimes associated with root infestation by *Pratylenchus pratensis*.
MARGINAL LEAF BLIGHT, LEAF SCORCH—nutritional deficiency, ?calcium or potassium. Idaho, Wash.
PITTING OF FRUIT—boron deficiency. Oreg. May be caused also by stony pit virus.
RED LEAF (especially in Oriental pear hybrids)—undetermined cause but probably a general response to adverse growing conditions.
ROUGH BARK—undetermined cause. Calif., Wash.
SCALD (discoloration of stored fruit)—immaturity, deficient ventilation.
STIGMONOSE—insect punctures during growth of fruit. Widespread.
TARGET CANKER—undetermined cause. Ga., N.Y., Va.; ?Calif., Wash. Possibly same as ?brown bark spot, measles.

Raphiolepis

R. indica (L.) Lindl., India-hawthorn.

Evergreen shrub of China, cultivated for ornament in California and Florida.

Sclerotium rolfsii Sacc., southern blight. Fla.

Rhodotypos

R. scandens (Thunb.) Makino, black jetbead.

Deciduous shrub of eastern Asia, cultivated for ornament, hardy in zone 4.

Ascochyta rhodotypi H.W.Anderson, leaf spot. Ill.
Gloeosporium sp. (?*G. nervisequum* Fckl.), anthracnose. Ill.
Nectria cinnabarina Tode ex Fr., coral spot, twig blight. Mass.

Rosa

I. Cultivated Roses [14]

Rosa spp.

Upright or trailing shrubs, usually prickly, the flowers prized for their beauty and ornament.

The principal garden types of roses are:

(a) "OLD ROSES," including derivatives of *R. gallica* L., French or Provence rose; *R. centifolia* L., cabbage and moss roses, a rose of ancient cultivation; *R. damascena* Mill., damask rose; *R. moschata* Herrm., musk rose; and *R. cinnamomea* L., cinnamon rose; of Europe and western Asia; cultivated in zones 4 to 6.

(b) BRIER ROSES, such as *R. foetida* Herrm., Austrian brier and Persian yellow roses; *R. hugonis* Hemsl., Hugo rose; *R. spinosissima* L., Scotch rose; of Europe and western Asia; cultivated in zones 4 and 5.

(c) SWEETBRIER ROSES, such as *R. eglanteria* L., eglantine sweetbrier; of Europe; cultivated in zone 4 and widely naturalized in the United States; also crosses presumably with *R. borboniana* Desp., producing Penzance hybrids; and crosses with *R. foetida* to produce a race known as *R. penzanceana* Rehd.

(d) PERPETUAL BRIER ROSES, such as *R. rugosa* Thunb. and hybrids with various other groups; of East Asia; cultivated in zones 2 and 3.

(e) TEA and CHINA ROSES, such as *R. odorata* Sweet, tea rose (from the odor); and *R. chinensis* Jacq., China or Bengal rose; of China; cultivated in zone 7.

(f) HYBRID PERPETUAL or REMONTANT ROSES (× *R. borboniana*), including × *R. noisettiana* Thory (*R. chinensis* × *R. moschata*), Noisette or Champney roses; × *R. borboniana* (*R. chinensis* × *R. damascena*), Bourbon rose; cultivated zone 4.

(g) HYBRID TEA ROSES (*R. dilecta* Rehd.), derived chiefly from crosses between hybrid perpetuals and *R. odorata;* and also crosses between these and *R. foetida,* producing the Pernetiana hybrids; cultivated in zone 5.

(h) MULTIFLORA ROSES (*R. multiflora* Thunb.), including garden roses, as Crimson Rambler, and understock roses; of East Asia; cultivated in zone 5.

(i) POLYANTHA (Floribunda) and BABY RAMBLER roses, derived from crosses between *R. multiflora, R. chinensis,* and hybrid teas.

(j) WICHURAIANA HYBRIDS, derived from *R. wichuraiana* Crép., Memorial rose, crossed with *R. multiflora* and *R. laevigata* Michx., Cherokee rose; including most of the large-flowered climbers; cultivated in zone 5.

(k) SETIGERA HYBRIDS, e. g., American Pillar, derived from the native *R. setigera* Michx., prairie rose, crossed with various other groups; cultivated in zone 4.

(l) EVERGREEN ROSES, including several types, such as *R. banksiae,* Ait. f., Banksia rose; *R. bracteata* Wendl., Macartney rose (var. Mermaid); and *R. laevigata;* all of eastern Asia; cultivated in zone 7.

Actinonema rosae (Lib.) Fr.: SEE *Diplocarpon rosae.*
Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Md. (D.C.); New England, Pa., Tex.
A. tumefaciens (E.F.Sm. & Town.) Conn, crown gall, stem gall. General. Endemic in some parts of Tex.
Alternaria sp. (usually reported as *A. brassicae* (Berk.) Sacc., *A. circinans* (Berk. & Curt.) Bolle), on leaves, ?leaf spot. Va. to Ala. and Tex., occasionally elsewhere.
A. brassicae var. *microspora* Brun., leaf spot. Tex.
Armillaria mellea Vahl ex Fr., root rot. Calif., Miss., Oreg., Tex., Wash.
Botryosphaeria ribis Gross. & Dug. var. *chromogena* Shear, N.E.Stevens, & M.S.Wilcox, canker, dieback. Ala., Md., Tex., Va.

[14] Because of the many and sometimes ambiguous species comprising the horticultural roses and, to some extent, the native rose flora, species differentiation within these two groups is not attempted in this Index. However, the cultivated roses (I), which are predominantly derived from Asiatic and European species, are segregated from those indigenous to our range or naturalized here (II).

Botrytis cinerea Pers. ex Fr., bud and twig blight, sometimes storage mold. Cosmopolitan.
Cercospora puderi B.H.Davis, leaf spot. Fla., Ga.
C. rosicola Pass.: See *Mycosphaerella rosicola.*
C. rosigena Tharp—Tex.
Chalaropsis thielavioides Peyronel, black mold, "Manetti mold," of grafts. Ill., N.Y., Pa.; on understocks from Oreg. and Wash.
Cladosporium sp. and *C. fuscum* Lk. ex Fr., leaf and bud mold. Alaska, Calif., Md., Minn., Miss., Okla., Tex. Severe on *R. odorata*, less so on *R. multiflora;* Ragged Robin is immune.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Coniosporium limoniiforme Syd., on leaves. Utah.
Coniothyrium fuckelii Sacc.: See *Leptosphaeria coniothyrium.*
Coniothyrium rosarum Cke. & Harkn. (probably =*C. fuckelii*), graft canker. Calif., Iowa, Mass., Minn., N.J., Pa., Tex.
C. wernsdorffiae Laub., brand canker. Colo., Ind., Minn., Miss, N.Y., Pa., Tex.
Corticium stevensii Burt: See *Pellicularia koleroga.*
Coryneopsis microsticta (Berk. & Br.) Grove (*Coryneum microstictum* Berk. & Br.): See *Griphosphaeria corticola.*
Coryneum microstictum var. *foliae* Dearn. & Overh., on leaves. N.Y.
Cryptosporella umbrina (Jenkins) Jenkins & Wehm. (*Diaporthe umbrina* Jenkins), crown canker of canes, also on buds and flowers. Mass. to Fla., Tex., Nebr., and Mich.; Calif., Idaho.
Cryptosporium minimum Laub., canker. Oreg., Pa.
Cucurbitaria rosae Wint. & Sacc., on canes. N.Mex., N.Y.
Cuscuta indecora Choisy and *C. paradoxa* Raf., dodder. Fla., Tex.
Cylindrocladium scoparium Morg., basal canker, crown canker. Mass. to Ga., Tex., and Ill.
Cytospora sp., dieback. Ky., Pa., Va., Wash.
Dermatea rosae (Sacc.) Rehm, on twigs. N.Dak. (=*Pezicula rosae* Sacc.).
Diaporthe eres Nits. (*Phomopsis* sp.), on canes, twigs, and buds. Calif., Ga., La., Md., Mo., N.Mex.
Didymella nigrificans Karst., on canes. N.Mex.
D. sepincoliformis (de N.) Sacc., dieback. Md.
Diplocarpon rosae Wolf (*Marssonina rosae* (Lib.) Lind, (*Actinonema rosae* (Lib.) Fr.), black spot. General.
Diplodia spp., canker, dieback (probably secondary). N.J. to Fla., Tex., and Nebr. Conidial stages of *Physalospora* spp.
D. natalensis P.Evans—Tex.
D. rosae Berk. & Curt. (*Microdiplodia rosae* (Berk. & Curt.) Tassi)—?Mass., Tex. Conidial stage of *Physalospora rhodina* (Berk. & Curt.) Cke.
Discosia artocreas Tode ex Fr., on buds and stems, probably saprophytic. La., Miss., Mo., Ohio.
Dothiorella sp., blossom blight, also on twigs and canes. La., Va.
Erwinia amylovora (Burr.) Winslow et al., fire blight. ?Experimental; natural infection not observed.
Fusarium spp., root rot. Occasional, chiefly in the South; not shown to be pathogenic.
Gloeosporium spp., twig and cane blight. Widespread. In part *G. rosaecola* Dearn. & Barth. or *G. rosarum* (Pass.) Grove, synonyms of *Sphaceloma rosarum*, q. v.; in part the conidial stage of the following.
Glomerella cingulata (Ston.) Spauld. & Schrenk, dieback. Md., N.J., Va.
Griphosphaeria corticola (Fckl.) Hoehn. (*Coryneopsis microsticta* (Berk. & Br.) Grove), canker, dieback. N.H. to Ala., N.Dak., Pacific Northwest.
Guignardia spinicola (Ell. & Ev.) Lindau, on thorns. Pa.
Hendersonia canina Brun., on stems. N.Y.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Hyaloceras depazeoides (Otth) Died., on ?twigs. Iowa.
Leptosphaeria coniothyrium (Fckl.) Sacc. (*Coniothyrium fuckelii* Sacc.), graft canker, common canker, sometimes leaf spot and dieback. General.
Leptothyrium rosarum Cke.: See *Pezizella oenotherae.*
Macrophoma sp., ?dieback. Tex., Va. Conidial stage of *Physalospora* sp.
Meloidogyne spp., root knot nematodes. Conn. to Fla., Mich., and Nebr.; Tex. to Calif. Reports from the North pertain mostly to greenhouse roses.
Monochaetia compta (Sacc.) Allesch. (=*?M. depazeoides* (Otth) Allesch., *?Hyaloceras depazeoides* (Otth) Died.), leaf spot. Alaska, Iowa, Kans., Md.
Mycosphaerella rosicola B.H.Davis (*Cercospora rosicola* Pass.), leaf spot. General except possibly the Far South; Okla., Tex. (on *R. laevigata*).
M. rosigena (Ell. & Ev.) Lindau, leaf spot. La., Md., N.C., N.J., N.Y., Ohio, Tenn.; C.Z., P.R. Possibly confused with the preceding and not certainly distinct; apparently more southern in distribution.
Myxosporium rosae Fckl. Reported occurrences are the conidial stage of *Cryptosporella umbrina* or of *Diaporthe eres*, q. v.
Nectria cinnabarina Tode ex Fr., coral spot on twigs and canes. Mass. to Va.; Wash., Alaska.
Pellicularia koleroga Cke., thread blight. Fla., La.
Peronospora sparsa Berk., downy mildew, chiefly on cuttings under glass. Maine to Fla. and Iowa; Calif.
Pestalotia spp., associated with leaf, stem, and bud necrosis but probably secondary; not critically identified. Species reported include: *P. compacta* Berk. & Curt.—Fla.; *P. discosioides* Ell. & Ev.—Del., Mich.; *P. rosae* West.—N.J. to Ala. and Tex.; *P. suffocata* Ell. & Ev.—Pa.
Pezicula rosae Sacc., on ?canes. N. Dak.
Pezizella oenotherae (Cke. & Ell.) Sacc., leaf and cane spot. N.J. to Fla., Tex., and Mich.
Phoma spp., on thorns and twigs. Widespread. Probably *Phomopsis.*
P. rhodocarpa Sacc., on fruits. N.Y.
Phomatospora rosae Rehm, on dead stems. N.Dak.
Phomopsis spp., on thorns, bark, and buds; associated with canker and dieback but probably secondary. Widespread. In part *Diaporthe eres* Nits. and *P. incarcerata* (Sacc.) Hoehn.
Phragmidium americanum (Pk.) Diet. (O,I,II,III), rust, on leaves of cultivated and native roses, *R. blanda* Ait., *R. carolina* L., *R. setigera*, and *R. virginiana* Mill.—Maine to N.C., Tex., and N.Dak.
P. disciflorum (Tode) James (=*P. mucronatum* (Pers.) Schlecht.), rust, O and I on leaves and stems, II and III on leaves, chiefly of cultivated roses of the *R. gallica* group. Eastern States to Rocky Mountains, Pacific coast, T.H.
P. speciosum (Fr.) Cke., rust, O and I on leaves and stems, III on stems, of cultivated (*R. rugosa, R. chinensis*) and native roses. Throughout the U.S., except in the Far South.
P. subcorticinum (Schrank) Wint., rust, O and I on stems, II and III on leaves. Commonly on cultivated roses of the brier and sweetbrier groups. Reported from all the States except the Southeastern and Southwestern; also Alaska. Arthur's "Manual" gives the distribution as "northern U.S. east of the Rocky Mountains."
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Wash.
Phyllosticta spp., on leaves. Species reported include: *P. erratica* Ell. & Ev.—Ala.; *P. rosae* Desm.—Widespread; Tex.; *P. rosicola* Massal.—N.J. Probably spermatial stages of *Mycosphaerella.*
P. rosarum Pass.: See *Sphaceloma rosarum.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.

Physalospora fusca N.E.Stevens, on canes. Fla., Ga.
P. obtusa (Schw.) Cke., cane blight. Conn. to Ala., Tex., and Kans.
P. rhodina (Berk. & Curt.) Cke., on canes. Fla., N.C.
Pilobolus sp., on leaves of greenhouse roses; superficial but unsightly, the sporangia discharged from coprophilous fungi. Occasional.
Pleosphaerulina corticola (Fckl.) Rehm: SEE *Griphosphaeria corticola.*
Pratylenchus pratensis (De Man) Filip., in roots. Ohio.
Ramularia macrospora Fres., root and collar rot. Md.
R. rubi (Wint.) Wr.—Ill.
Sclerotium rolfsii Sacc., southern blight. Fla., Kans., Tex.
Septoria rosae Desm., leaf spot. Miss., N.J., S.C., P.R.
Sphaceloma rosarum (Pass.) Jenkins, anthracnose, stem canker, and leaf spot. Maine to Fla., Mich., Mo., Tex., and Kans.; Pacific Coast States. Occurs especially on climbing roses; attacks some varieties resistant to black spot.
Sphaeropsis rosarum Cke. & Ell.: SEE *Physalospora obtusa.*
Sphaerotheca humuli (DC.) Burr. and *S. pannosa* (Wallr.) Lév., powdery mildew. General. Following Salmon, "Monograph of the Erysiphaceae," rose mildew has been widely attributed in the U.S. to the first-named species, especially on wild roses and on the foliage of the greenhouse roses as distinguished from that more prevalent on the buds and shoots of garden roses. Other studies indicate that greenhouse rose mildew is caused in the U.S., as in Europe, by *S. pannosa* var. *rosae* Wor. Both *S. humuli* and *S. pannosa* have been authentically identified on roses in the perithecial stage but most collections include only the conidial stage in which the two species are hardly distinguishable; this may account for conflicting reports on varietal resistance.
Valsa ambiens Pers. ex Fr., on dead canes. Cosmopolitan.
Verticillium sp., wilt. Ark., N.Y. On *R. hugonis* in N.Y.
V. albo-atrum Reinke & Berth.—Calif., Ill., N.J.

MOSAIC (infectious chlorosis)—virus (*Marmor rosae* Holmes, Rosa virus 1 Brierley ex K.M.Sm.). Chiefly on greenhouse roses in the Eastern and Central States, sometimes on garden roses; identified but infrequent on understock and other roses in Pacific Coast States; on *R. manettii* Crivelli in Tex. A yellow variety, Rosa virus 2 Brierley ex K.M.Sm., is reported in Ill., Md., N.Y., Pa., Va., and possibly also in Calif. as Rose mosaics 2 and 3 Thomas & Massey. *Rosa* spp. have been shown experimentally susceptible to the viruses of apple mosaic (*Marmor mali* Holmes, Pyrus virus 2 K.M.Sm.) and yellow bud mosaic (Winters peach mosaic).

STREAK (?veinal chlorosis)—virus (*Marmor venenifera* Holmes, Rosa virus 4 Brierley ex K.M.Sm.). On various kinds of roses in Md., N.J., N.Y., Tex., Va.

CHLOROSIS—mineral deficiency due to alkaline soil. Nebr., Tex.

CRINKLE—virosis-like but not shown transmissible, occurring especially in the Manetti and other understock roses, sometimes in garden roses. Pacific Coast States, Md., N.Y., Pa., Tex., and Va.

PEDICEL NECROSIS (collapse of flower stem)—cause unknown. N.Y. to Md. and Ohio.

ROOT GALL—cause unknown, probably nonparasitic. Calif., Md. Occurs in *R. odorata.*

ROUGH BARK—cause unknown, possibly virus. Calif.

SPECKLE—chlorotic flecks in leaves; cause unknown; not transmitted by grafting. Occurring especially on *R. multiflora* and sometimes on other roses in Md., N.J., N.Y., Pa., Tex., Va.

II. Native Species

Rosa spp., native to the United States and its possessions.

Of about 15 native species of roses, only *R. setigera* Michx., prairie rose, has been used extensively in horticulture. However, forms of the following also are cultivated: in zone 3, *R. arkansana* Porter var. *suffulta* (Greene) Cockerell (*R. suffulta* Greene), *R. nitida* Willd., *R. virginiana* Mill., and *R. woodsii* Lindl.; in zone 4, *R. acicularis* Lindl., *R. arkansana*, *R. carolina* L.; in zone 5, *R. californica* Cham. & Schlecht., *R. foliolosa* Nutt., and *R. nutkana* Presl. Several species are important in erosion control or furnish forage and wildlife food.

The following introduced species have become naturalized: *R. bracteata* Wendl. and *R. laevigata* Michx. in the South; *R. canina* L., *R. cinnamomea* L., *R. eglanteria* L., *R. gallica* L., *R. micrantha* Sm., and *R. spinosissima* L. in the Eastern States; *R. eglanteria* in the Pacific Northwest.

In the following list, the reported disease occurrences apply to several but not necessarily all of the preceding species, unless a more restricted distribution is given.

Botryosphaeria ribis Gross. & Dug. and var. *chromogena* Shear, N.E.Stevens, and M.S.Wilcox, canker, dieback. Md., Va.
Botrytis cinerea Pers. ex Fr., blossom rot. Tex.
Cercospora sp., leaf spot. Mich.
C. rosicola Pass.: SEE *Mycosphaerella rosicola.*
Cryptosporella umbrina (Jenkins) Jenkins & Wehm., brown canker. Md., Mich., N.J., N.Y., Tex., Va., W.Va.
Cylindrocladium scoparium Morg., crown canker. Tex.
Diatrype tristicha de N. (*Valseutypella tristicha* (de N.) Hoehn.), on dead stems. Calif., N.Dak.
Diplocarpon rosae Wolf, black spot. Widespread but infrequent. On *R. bracteata* in N.C. In Europe *D. rosae* has been found on the following species:[15] *arvenis** Huds., *canina**, *dumetorum* Thuill. (=*R. canina* var. *dumetorum* Baker), *eglanteria**, *elliptica* Tausch (=*R. inodora* Fr.), *foetida** Herrm., *glauca* Pourr. (=*R. rubrifolia* Vill.), *hemitricha* Ripart, *pomifera* Herrm., *thuilleri* Dalla Torre & Sarnth., *uriensis* Lagg. & Puget, and *vogesiaca* Desp. (=*R. dumalis* Beckstein according to Rehder).
Diplodia sarmentorum Fr., on branches. Calif.
Discosia artocreas Tode ex Fr., on flowers, ?blight. Tex.
Griphosphaeria corticola (Fckl.) Hoehn., canker, dieback. N. Dak.
Hendersonia hypocarpa Fairman (*Coryneum microstictum* Berk. & Br. =*Coryneopsis microsticta* (Berk. & Br.) Grove), ?on fruits, pedicels. N.Y.
Leptosphaeria coniothyrium (Fckl.) Sacc., canker, dieback. Va.
Mycosphaerella rosicola B. H. Davis, leaf spot. Ga. to N.C. to Kans. and Wis.; Wash.; on *R. foliosa* and *R. setigera* in Okla.
Nectria cinnabarina Tode ex Fr., coral spot, dieback. Alaska, N.Y.
Peronospora sparsa Berk., downy mildew. Calif., Iowa, Tex.

[15] Species with asterisk occur in North America or are cultivated there.

Phoma sepincola (Kickx) Sacc., on twigs. Nebr.
Phragmidium americanum (Pk.) Diet. (O, I, II, III), rust. Eastern States to Mont. and Tex.
P. montivagum Arth. (O,I,II,III), rust. S. Dak. to N. Mex., Ariz., and Wash.
P. mucronatum (Pers.) Schlecht. (O, I, II, III), rust. Ill., Kans., Wis. Usually on cultivated roses, occurrence on native species not critically confirmed.
P. rosae-acicularis Liro (O,I,II,III), rust. Mich. to Colo. and Wyo.; Calif.
P. rosae-californicae Diet. (O,I,II,III), rust. Ariz., Calif., Mont., Oreg.
P. rosicola (Ell. & Ev.) Arth. (III), rust. Colo., Mont., Nebr.
P. speciosum (Fr.) Cke. (O, I, III), rust. Eastern States to Rocky Mountains (on *R. blanda* Ait., *R. carolina* L., *R. virginiana*, and *R. woodsii)*; on *R. palustris* Marsh. in Fla.
P. subcorticinum (Schrank) Wint. (O, I, II, III), rust. Colo., Maine, Minn., Mont.
Phyllactinia guttata (Fr.) Lév. *(P. corylea* Pers. ex Karst.), powdery mildew. Wash.
Phyllosticta indianensis Van Hook—On *R. setigera* in Ind.
P. rosae Desm., leaf spot. N.Y. to Fla. and Ind.; Colo.
P. rosae-setigerae Van Hook—On *R. setigera* in Ind.
P. rosarum Pass.: SEE *Sphaceloma rosarum.*
Physalospora obtusa (Schw.) Cke., on canes. Md., N. Dak., Tex., Va.
Rosellinia rosarum Niessl—N. Dak., N. Mex.
Sphaceloma rosarum (Pass.) Jenkins, anthracnose. N.Y. to Mich. and Tex.; N.C., Tenn.; Calif., Oreg.
Sphaeronemella rosae Ell. & Ev., on canes and twigs. Md., N.J., Va.
Sphaerotheca humuli (DC.) Burr., powdery mildew. Conn. to Va., Tex., Calif., and Wash. According to Salmon, the most common species on roses in the U.S.
S. pannosa (Wallr.) Lév. var. *rosae* Wor., powdery mildew. General. According to Salmon, *S. pannosa* is infrequent among American collections, but this name is widely used in reports.
Tapesia rosae (Pers. ex. Fr.) Fckl.—N.Y., Pa.
Valsa ambiens Pers. ex. Fr., on dead stems. N. Dak., N.Y.
CRINKLE—cause unknown. Oreg., Wash. (on *R. gymnocarpa* Nutt. and *R. nutkana).*

Rubus, brambles

I. Blackberries

A. Biennial species

Rubus spp.

Deciduous shrubs of the cultivated biennial cane types; the group derived chiefly from the following native species ranging from New England to the Southern and Central States: *R. allegheniensis* Porter, Alleghany blackberry, *R. argutus* Link (*R. ostryifolius* Rydb.), highbush blackberry, and *R. frondosus* Bigel., yankee blackberry, together with other closely related forms and hybrids and crosses between them and other *Rubus* spp.; cultivated in zones 3 and 4.

Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Oreg.
A. rubi (Hildebrand) Starr & Weiss, cane gall. N.Y., Oreg., Pa., Wash., Wis.
A. tumefaciens (E.F.Sm. & Town.) Conn, crown gall. General.
Apioporthe vepris (Lacroix) Wehm., on twigs. Va., W.Va.
Armillaria mellea Vahl. ex Fr., root rot. Tex., Wash.
Asterella rubi (Fckl.) Hoehn., on canes. Va.
Botryosphaeria ribis Gross. & Dug., on canes. Ala.
Botrytis cinerea Pers. ex Fr., gray mold of fruit, occasionally bud and shoot blight. General, especially in the Pacific Northwest.
Cephaleuros virescens Kunze, algal leaf spot, green scurf. Fla.
Ceratobasidium anceps (Bres. & Syd.) Jacks., leaf spot. Wis. (on *R. allegheniensis*).
Cercospora rubi Sacc. (*C. bliti* Tharp, *C. septorioides* Ell. & Ev., *?C. rubicola* Thuem.): SEE *Mycosphaerella confusa.*
Cercosporella rubi (Wint.) Plakidas (*Fusisporium rubi* Wint., *Ramularia rubi* (Wint.) Wr.), rosette, double blossom. N.Y. to Fla., Tex., and Ill.
Cladosporium sp., fruit mold. Wash.
Coniothyrium fuckelii Sacc.: SEE *Leptosphaeria coniothyrium.*
Corticium galactinum (Fr.) Burt, white root rot. Ark., Md., Va.
C. stevensii Burt: SEE *Pellicularia koleroga.*
Cylindrosporium rubi Ell. & Morg., leaf spot. N.C., Tex. SEE ALSO *Septoria rubi* in this section and *Sphaerulina rubi* in Rubus section III.
Didymella applanata (Niessl) Sacc., spur blight. Va., Wis.
Discosia artocreas Tode ex Fr., on leaves. Ala.
Elsinoë veneta (Burkh.) Jenkins (*Sphaceloma necator* (Ell. & Ev.) Jenkins & Shear), anthracnose. General.
Gloeodes pomigena (Schw.) Colby, sooty blotch. Md. to N.C. and Ind.; Tex.
Gloeosporium rufomaculans (Berk.) Thuem. (*G. rubi* Ell. & Ev.): SEE *Glomerella cingulata.*
Glomerella cingulata (Ston.) Spauld. & Schrenk, on canes, ?canker. Md., Va. Ascigerous stage of *Gloeosporium rufomaculans.*
Gnomonia rubi Rehm, ?cane blight. Maine, N.Y., Pa., Vt.
Gymnoconia peckiana (Howe) Trott. (O,I,III), orange rust. The microcyclic form, *Kunkelia nitens*, q.v., is reported to be more common than this form on blackberries and to range farther south and perhaps west. Collections assigned to this species, but only in part confirmed by germination tests, indicate its occurrence on wild and cultivated blackberries throughout the Northeastern and North Central States to Ga., Ill., and Minn.; also occasional in the Western States to the Pacific coast.
Hendersonia platypus Ell. & Ev., on twigs. Ill.
Hypoderma virgultorum (Pers. ex Fr.) DC., on canes. N.C., Va.
Kuehneola uredinis (Lk.) Arth. (O,I,II,III), yellow rust, cane rust. Maine to Fla., La., and Iowa.
Kunkelia nitens (Schw.) Arth. (I), orange rust. General but probably more common in the Southern, and possibly the Western, States than the demicyclic form. On cultivated and wild blackberries, often perennial.
Leptosphaeria coniothyrium (Fckl.) Sacc. *(Coniothyrium fuckelii* Sacc.), cane blight. N.Y. to N.C., Tex., and Wis.; Pacific Northwest.
Leptothyrium pomi (Mont. & Fr.) Sacc. *(?Microthyriella rubi* Petr.), flyspeck, on canes and leaves. Pa. to N.C. and Ill.
Lophodermium rubiicola Earle, on canes. Ala., Ga.
Mycosphaerella confusa Wolf (*Cercospora rubi* Sacc.), leaf spot, blotch. Va. to Fla. and Tex.; Ill., Ind.
M. rubi Roark, leaf spot. This was described as the ascigerous stage of *Septoria rubi*, q.v., and reports under the name *M. rubi*, from nearly all the States, probably mostly refer to the latter fungus. Definite records of an ascus stage identified as this are few, viz., N.C., Wis. The connection between *M. rubi* and *S. rubi* does not ap-

pear to be satisfactorily proved. SEE ALSO *M. ligea* in *Rubus* section IB, and *Sphaerulina rubi* in section IIIA.

M. rubina (Pk.) Jacz.: SEE *Didymella applanta.*

Pellicularia koleroga Cke., thread blight. La.

Peronospora rubi Rab., downy mildew. Md., Wis.

Pezicula rubi (Lib.) Niessl, on dead canes. N.C., N.J., N.Y., Pa., Tenn.

Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot, fruit rot. Md., Ohio, Va.

Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Mich.

Phyllosticta spp., *P. allegheniensis* Tehon & Stout, *P. ruborum* Sacc., *P. villosa* Ell. & Ev. (a nomen nudum), leaf spot. Fla., Ill., N.C., N.H., W.Va. Probably spermatial stages of *Mycosphaerella* spp.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Physalospora obtusa (Schw.) Cke., on canes. Ga.

P. rhodina (Berk. & Curt.) Cke. *(Diplodia natalensis* P. Evans), on canes. Ala.

Rhabdospora rubi Ell., on canes. Del., N.J. (=*?Septoria rubi* West).

Rhizoctonia solani Kuehn, root and collar rot. Colo.

Septoria darrowi Zeller *(S. brevispora* (Sacc.) Zeller; *S. rubi* West. var. *brevispora* Sacc.), leaf spot. Wis. Zeller states this is the farthest west collection for this species, on unspecified blackberry species; presumably blackberry, again not specified, was present in his material from Md. and N.C. =*?Cylindrosporium rubi*, q.v. See also *S. rubi.*

S. rubi West. *(S. comitata* J. J. Davis, *S. rubi* Berk. & Curt.), leaf and cane spot. Generally reported. Perfect stage said to be *Mycosphaerella rubi*, q.v., but connection is unconfirmed and perhaps questionable. *S. rubi, S. darrowi, Cylindrosporium rubi, Rhabdospora rubi,* and probably other imperfect forms, are much confused as to identity, host range, occurrence, and relationships, in the reports. SEE ALSO *Mycosphaerella ligea* in section IB and *Sphaerulina rubi* in section IIIA.

Sphaerotheca humuli (DC.) Burr., powdery mildew. Conn. to Md., Ill., and Minn.; Pacific Northwest.

Sphaerulina rubi Demaree & M. S. Wilcox: See note under *Septoria rubi.*

Stigmatea rubicola (Ell. & Ev.) Th., on leaves. N.J., N.Y., Pa.

Valsa ceratophora Tul., on canes. N.Y., Pa., Va.

Verticillium albo-atrum Reinke & Berth., wilt. Calif., Minn., N.Y., Wash.

DWARF—loganberry-dwarf virus *(Nanus loganobacci* Holmes, Rubus virus 5 Zeller ex K.M.Sm.) Oreg.

LEAF CURL—raspberry beta-curl virus *(Corium rubi* Holmes var. *beta* Holmes, Rubus virus 3A Bennett ex K.M.Sm.). Mich.

MOSAIC—one or more viruses including *Marmor rubi* Holmes (Rubus virus 1 Rankin & Hockey ex K.M. Sm.) and Rubus virus 2 Bennett ex K.M.Sm. Mass. to Va., Iowa, and Wis.; Pacific Northwest.

STREAK—virus *(Nanus orientalis* Holmes, Rubus virus 4 Wilcox ex K.M.Sm.). Ohio, Pa., Wash.

VARIEGATION—unidentified virus. Md. Natural infection on *R. allegheniensis;* artificial transmission to black raspberry.

B. Perennial species

Rubus spp.

Cultivated shrubs, of the perennial cane types, mostly evergreen; of European origin but locally naturalized in some of the Eastern and Pacific Coast States, especially *R. laciniatus* Willd., cutleafed blackberry, *R. procerus* P. J. Muell., Himalaya blackberry, and *R. ulmifolius* Schott var. *inermis* (Willd.) Focke, evergreen thornless blackberry; cultivated in zone 5. A few records apply also to *R. fruticosus* L., European blackberry, and related types, rarely cultivated here.

Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Oreg.

A. rubi (Hildebrand) Starr & Weiss, cane gall. Oreg., Wash.

A. tumefaciens (E.F.Sm. & Town.) Conn, crown gall. General.

Ascospora ruborum Zeller *(Hendersonia rubi* (West.) Sacc.), cane spot. Wash.

Botrytis cinerea Pers. ex Fr., fruit rot, shoot blight. Pacific Coast States.

Coniothyrium fuckelii Sacc., cane blight. Oreg.

Coryneum ruborum Oud.: SEE *Hendersonia rubi* and *Ascospora ruborum.*

Elsinoë veneta (Burkh.) Jenkins, anthracnose. Oreg., Wash. Seldom on these types.

Gnomonia rubi Rehm, ?cane blight. Md.

Hapalosphaeria deformans Syd., stamen blight, dry berry. Oreg., Wash.

Hendersonia rubi (West.) Sacc.: SEE *Ascospora ruborum.*

Kuehneola uredinis (Lk.) Arth., yellow rust, cane rust. Pacific Coast States. On *R. laciniatus* only.

Mycosphaerella confusa Wolf *(Cercospora rubi* Sacc.), leaf spot, blotch. Ala., N.C., N.J.

M. ligea (Sacc.) Zeller, on overwintered leaves. Oreg. According to Zeller, this species is associated with *Septoria rubi* in Oreg. plantings of *R. laciniatus* and *R. procerus* and an organic connection between the two forms seems apparent although never proven; on the other hand, no *Mycosphaerella* referable to *M. rubi* has been seen in Oreg. on any *Rubus* variety.

M. rubi Roark *(Septoria rubi* West.), leaf spot. Calif.

Peronospora rubi Rab., downy mildew. Oreg.

Pezizella oenotherae (Cke. & Ell.) Sacc., leaf spot, canker. Va.

Phomopsis sp., canker. Wash.

Phyllosticta dearnessii Sacc., ?leaves. Oreg. (on *R. procerus).*

Septoria darrowi Zeller *(S. brevispora* (Sacc.) Zeller), leaf spot. Md.

S. rubi West., leaf and cane spot. Oreg., Wash.

Sphaerotheca humuli (DC.) Burr., powdery mildew. Oreg.

MOSAIC—undetermined virus *(?Marmor rubi* Holmes, Rubus viruses 1 Rankin & Hockey ex K.M.Sm. and 2 Bennett ex K.M.Sm.). Idaho, Oreg., Wash.

BLOSSOM BLIGHT—cause unknown. Oreg.

DIEBACK—cause unknown. Oreg., Wash.

RED BERRY—caused by feeding of mites *(Eriophyes gracilis* Nal.). Calif.

C. Native species

Rubus spp.

Native species, chiefly those which are not sources of cultivated varieties, such as *R. canadensis* L., thornless (smooth) blackberry, of New England to Ga. and Minn., and *R. cuneifolius* Pursh, sand blackberry, of the eastern Coastal Plain from Connecticut to Florida.

Cercosporella rubi (Wint.) Plakidas, rosette. Ill., N.C.

Corticium microsclerotia G. F. Weber: SEE *Rhizoctonia microsclerotia.*

C. stevensii Burt: SEE *Pellicularia koleroga.*

Cuscuta compacta Juss., dodder. Fla.

Gloeosporium papulatum Dearn., on leaves. Tenn.

Gymnoconia peckiana (Howe) Trott. (O,I,III), orange rust. Maine to Tenn. and Minn.

Kuehneola uredinis (Lk.) Arth. (O,I,II,III), yellow rust, cane rust. Maine to Fla., Ala., and Wis.
Kunkelia nitens (Schw.) Arth. (I), orange rust. Maine to Fla., La., and Minn.
Mycosphaerella confusa Wolf *(Cercospora rubi* Sacc.), leaf spot, blotch. Ala., Md., N.J., W.Va.
M. rubi Roark (*Septoria rubi* West.), leaf spot. Reports under this name from Conn. to N.C., La., and Mich.
Pellicularia koleroga Cke. *(Corticium stevensii* Burt), thread blight. Fla.
Peronospora rubi Rab., downy mildew. Md.
Pezicula rubi (Lib.) Niessl, on canes. N.H., Tenn.
Rhizoctonia microsclerotia Matz *(Corticium microsclerotia* G. F. Weber), web blight. Fla. Perfect stage =a *Pellicularia.*
Septoria rubi West., leaf spot. Iowa, Tex. SEE ALSO *Mycosphaerella rubi.*
Sphaerotheca humuli (DC.) Burr., powdery mildew. Minn., Pa., Wash.
Stigmatea rubicola (Ell. & Ev.) Th., on leaves. N.Y., Pa., Wis.

II. Dewberries

A. Eastern types

Rubus spp.

Species of the eastern types derived in part from *R. flagellaris* Willd., northern dewberry, or the closely related species *R. baileyanus* Britt. and *R. enslenii* Tratt. (regarded as forms only of the species by some authors), occurring from New England to the Great Lakes and Gulf States, cultivated in zone 3; and in part from *R. trivialis* Michx., southern dewberry, occurring from Va. to Fla. and Tex., cultivated in zone 6; also from hybrids with other *Rubus* spp.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Conn., Fla., N.C., Ohio.
Apioporthe vepris (Lacroix) Wehm., on stems. N.C.
Armillaria mellea Vahl ex Fr., root rot. Tex.
Botrytis cinerea Pers. ex Fr., gray mold of fruit. N.C.
Cercosporella rubi (Wint.) Plakidas, rosette, double blossom. N.Y. to Ala., Ill., and Tex.
Collybia dryophila Fr., root rot. N.C.
Corticium galactinum (Fr.) Burt, root rot. Md., Va.
Elsinoë veneta (Burkh.) Jenkins, anthracnose. General.
Gloeodes pomigena (Schw.) Colby, sooty blotch. N.C., Pa.
Glomerella cingulata (Ston.) Spauld. & Schrenk, canker, fruit rot. Ga., Ill., Md., Miss.
Gnomonia rostellata (Fr.) Wehm., on stems. N.C.
Gymnoconia peckiana (Howe) Trott. (O,I,III), orange rust. Maine to Va., Mo., and Minn., possibly south and west; reported from Tex. on wild *R. trivialis.* Some varieties are highly resistant or immune, e.g. Lucretia.
Helicobasidium purpureum (Tul.) Pat., violet root rot. N.C., Tex.
Hypoderma virgultorum (Pers. ex Fr.) DC., on stems. N.Y., W.Va.
Irenina sanguinea (Ell. & Ev.) F.L.Stevens, black mildew, leaf spot. Ala., La.
Kuehneola uredinis (Lk.) Arth., yellow rust. Maine to Fla., Tex., and Kans.
Kunkelia nitens (Schw.) Arth. (I), orange rust. Conn. to Fla., Tex., and Iowa.
Leptosphaeria coniothyrium (Fckl.) Sacc., cane blight, dieback. N.J. to Ala. and Tex.
Leptothyrium pomi (Mont. & Fr.) Sacc., flyspeck. N.C.
Mainsia epiphylla (Arth.) Jacks. (II,III), rust. On *R. trivialis* in Tex.
Monochaetia desmazierii Sacc., on stems. N.C., Tenn., Va.
Mycosphaerella confusa Wolf (*Cercospora rubi* Sacc.), leaf spot, blotch. N.J. to Fla., Tex., and Ill.
M. rubi Roark (*Septoria rubi* West.), leaf spot. General. ?Perhaps mostly the imperfect form reported under this name; perithecial stage reported on *R. hispidus* L., swamp dewberry, in Wis. A *Mycosphaerella* resembling this, except for slightly smaller spores, was found on dewberry in Md. and N.C. and on blackberry in N.C.; evidence in this case did not indicate connection with *S. rubi.*
Peronospora potentillae d By., downy mildew. Conn., Ill., La.
P. rubi Rab. *(=P. potentillae),* downy mildew. Fla., Md., Wash., Wis
Pezicula rubi (Lib.) Niessl, on stems. N.J., N.Y., W.Va.
Pezizella oenotherae (Cke. & Ell.) Sacc., leaf and cane spot, fruit rot. Md. to N.C.
Phomopsis sp. and *P. rubiseda* Fairm., on twigs. N.Y.
Phyllosticta dispergens Tehon, leaf spot. Ill.
P. ruborum Sacc.—Miss., N.Y.
Phyllostictina carpogena Shear, fruit rot. Md., N.C., N.J., N.Y.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on stems. Ala., Maine, W.Va.
Rhizoctonia crocorum (Pers. ex Fr.) DC.: SEE *Helicobasidium purpureum.*
Septoria darrowi Zeller, leaf spot. N.Y. (on *R. hispidus*).
S. rubi West., leaf spot. Reported on various *Rubus* spp. (=dewberries) in Ga., La., N.C., S.C. SEE ALSO *Mycosphaerella rubi.*
Sphaerotheca humuli (DC.) Burr., powdery mildew. Idaho, Ill., Minn., Ohio, Pa., Tex.
Synchytrium aureum Schroet., yellow leaf gall. Wis.
Verticillium albo-atrum Reinke & Berth., wilt. Calif.
LEAF CURL—virus (*Corium rubi* Holmes var. *beta* Holmes, Rubus virus 3A Bennett ex K.M.Sm.). Mich., Ohio, Tex.
MOSAIC—virus(es) (*Marmor rubi* Holmes, Rubus virus 1 Rankin & Hockey ex K.M.Sm). Conn., Mich., N.J., N.Y. Also Rubus virus 2 Bennett ex K.M.Sm. —Mich., N.Y

B. Western types

Rubus spp.

Species of the western types derived from *R. ursinus* Cham. & Schlecht., California dewberry, and especially its variety *vitifolius* (Cham. & Schlecht.) Focke, grapeleaf dewberry, occurring in California and Oregon, cultivated in zone 5. Forms of the latter, perhaps influenced by hybridity, have been given distinctive names, such as *R. loganobaccus* Bailey, loganberry, and *R. titanus* Bailey, mammoth blackberry. A few records on *R. macropetalus* Dougl., trailing blackberry, occurring from Idaho to Washington and California, are included.

Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Oreg.
A. rubi (Hildebrand) Starr & Weiss, cane gall. N.Y., Oreg.
A. tumefaciens (E.F.Sm. & Town.) Conn, crown gall. General.
Armillaria mellea Vahl ex Fr., root rot. Oreg.
Ascospora ruborum Zeller (*Hendersonia rubi* (West.) Sacc.), cane spot. Ala., Calif.
Cercosporella rubi (Wint.) Plakidas, rosette, double blossom. La., Miss., Tex.
Didymella applanata (Niessl) Sacc., spur blight. Oreg., Wash.

Elsinoë veneta (Burkh.) Jenkins (*Sphaceloma necator* (Ell. & Ev.) Jenkins & Shear), anthracnose. General; seldom on these types in Oreg.
?Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf spot, cane canker, dieback. Idaho. Perhaps (?) *Gloeosporium venetum* Speg. intended.
Gnomonia rubi Rehm, on canes. Oreg.
Gymnoconia peckiana (Howe) Trott. (O,I,III), orange rust. Calif., Va.
Hapalosphaeria deformans Syd., dry berry, stamen blight. Oreg., Wash.
Kuehneola uredinis (Lk.) Arth. (O,I,II,III), yellow rust. Calif., Wash.
Kunkelia nitens (Schw.) Arth. (I), orange rust. Calif., Oreg., Va.
Leptosphaeria coniothyrium (Fckl.) Sacc., cane blight. Tex., Wash. Seldom on these varieties.
L. thomasiana Sacc. & Roum., cane blight. Oreg., Wash.
Mycosphaerella confusa Wolf (*Cercospora rubi* Sacc.), leaf spot. Ga., Miss., Tex.
M. ligea (Sacc.) Zeller, on overwintered leaves. Oreg. (on loganberry). See note on this in section IB.
M. rubi Roark: See *Septoria rubi*.
Peronospora rubi Rab., downy mildew. Wash.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pyrenopeziza rubi (Fr.) Rehm, on canes. Calif.
Rhizoctonia solani Kuehn, collar rot. Wash.
Septoria darrowi Zeller, leaf spot. ?Md., N.C.
S. rubi West., leaf spot, sometimes canker and dieback. General.
Sphaerotheca humuli (DC.) Burr., powdery mildew. Pacific Northwest.
Verticillium albo-atrum Reinke & Berth., wilt. Calif., N.Y., Oreg.

Dwarf—virus (*Nanus loganobacci* Holmes, Rubus virus 5 Zeller ex K.M.Sm.). Calif., Oreg., Wash. Especially on loganberry; also on Phenomenal but not naturally infecting Boysen or Young; occurs naturally on *R. ursinus*.
Mosaic—undetermined virus (*?Marmor rubi* Holmes, Rubus virus 1 Rankin & Hockey ex K.M.Sm.). Calif. and Pacific Northwest.

III. Raspberries

A. Red

Rubus spp.

Upright shrubs, the sweet "berries" familiar to all. Cultivated red raspberries derive chiefly from *R. idaeus* L. var. *strigosus* (Michx.) Maxim. (=*R. strigosus* Michx.), American red raspberry, which occurs from New England to Virginia and the Rocky Mountains north to Alaska. The European raspberry, *R. idaeus* var. *idaeus*, is represented in the ancestry of some varieties and occurs rarely as an escape; the var. *aculeatissimus* Regel & Tiling, western red raspberry, occurs in the western part of this range; cultivated in zone 3.

Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Oreg.
A. rubi (Hildebrand) Starr & Weiss, cane gall. N.Y., Oreg., Pa.
A. tumefaciens (E.F.Sm. & Town.) Conn, crown gall. General; Oreg.
Alternaria sp., fruit rot. Mass., N.Y.
Armillaria mellea Vahl ex Fr., root rot. Oreg., Wash.
Ascospora ruborum Zeller (*Hendersonia rubi* (West.) Sacc.), cane spot, dieback. Mass., Oreg., Wash.
Botryosphaeria ribis Gross. & Dug. var. *chromogena* Shear, N.E.Stevens, & M.S.Wilcox, on canes. Fla.
Botrytis cinerea Pers. ex Fr., gray mold of fruit, sometimes flower and shoot blight. Cosmopolitan.
Cercospora rubi Sacc.: See *Mycosphaerella confusa*.
Cercosporella rubi (Wint.) Plakidas, double blossom, rosette. Ill., Md., N.Y., Pa.
Clypeosphaeria hendersoni (Ell.) Sacc., on dead canes. Mich., N.J., N.Y.
Coryneum microstictum Berk. & Br., on canes. Maine.
?Ascospora ruborum, q. v.
C. ruborum Oud.: See *Ascospora ruborum*.
Cuscuta gronovii Willd., dodder. Conn., Ill., Wis.
Cylindrosporium rubi Ell. & Morg., leaf spot, cane spot. Common east of the Rocky Mountains on *R. idaeus* and *R. strigosus*. Imperfect stage of *Sphaerulina rubi* Demaree & M. S. Wilcox, q. v. Evidence indicates that this species has been generally reported on raspberries under the name *Septoria rubi* West., but that it is not the same as *S. rubi* on blackberry and dewberry, and that it is restricted to raspberries. *Septoria darrowi* and *Rhabdospora rubi*, q. v., may be synonyms.
Cytospora sp. and *C. rubi* Schw., on dead stems. Idaho, N.J., Oreg., Pa.
Didymella applanata (Niessl) Sacc., spur blight, gray bark. General.
Didymosphaeria manitobensis Ell. & Ev., on leaves. Mich.
Elsinoë veneta (Burkh.) Jenkins (*Sphaceloma necator* (Ell. & Ev.) Jenkins & Shear), anthracnose. General but less common on red than on black raspberries.
Erwinia amylovora (Burr.) Winslow et al., twig and blossom blight. Maine, N.C., Wash.
Gloeosporium allantosporum Fautr., anthracnose, dieback. Oreg., Wash.
G. cingulatum Atk.: See *Glomerella cingulata*.
G. rubicola Ell. & Ev.: See *Glomerella rubicola*.
Glomerella cingulata (Ston.) Spauld. & Schrenk, canker, dieback. Ark., Md., N.J., Ohio, R.I., W.Va.
G. rubicola (Ell. & Ev.) Spauld. & Schrenk, white bud, canker. Ill., N.J., W.Va.
Gnomonia depressula Karst., on dead canes. Alaska.
G. rostellata (Fr.) Wehm., on stems. Iowa.
G. rubi Rehm—Oreg.
Graphium gracile Pk., on leaves. Ind., Iowa, N.Y., Wis.
Gymnoconia peckiana (Howe) Trott., orange rust. Although sometimes reported on red raspberry in the New England and Great Lakes States to the Pacific coast, these reports are not authenticated. There are no reports of the short-cycle rust, *Kunkelia nitens* (Schw.) Arth., on species in this section.
Hypoderma virgultorum (Pers. ex Fr.) DC., on dead canes. Mass., N.H., Oreg.
Kuehneola uredinis (Lk.) Arth. (O,I,II,III), yellow rust. ?Calif., Ill., Pa. Not recorded for these species by Arthur.
Leptosphaeria coniothyrium (Fckl.) Sacc. (*Coniothyrium fuckelii* Sacc.), cane blight, leaf spot. General.
L. thomasiana Sacc. & Roum., cane blight. Oreg. Zeller does not list this in his later work (1944); only *L. coniothyrium*.
Leptothyrium pomi (Mont. & Fr.) Sacc., flyspeck. Ind., Ky., Mass.
Macrophoma rubi Tehon, stem canker. Ill.
Monilinia fructicola (Wint.) Honey, brown rot of berries. Ill.
Monochaetia desmazierii Sacc., on leaves. Alaska, Iowa.
Mycosphaerella confusa Wolf (*Cercospora rubi* Sacc.), leaf spot. Ga.
M. fructicum Starb., on leaves. Alaska.
M. rubi Roark, leaf spot. Wis. Found by Roark on overwintered leaves of *R. strigosus*. See also *Sphaerulina rubi*.
M. rubina (Pk.) Jacz.: See *Didymella applanata*.
Nectria cinnabarina Tode ex Fr., on canes. Alaska.
Pezicula rubi (Lib.) Niessl, on dead canes. Maine, N.Y.

Pezizella oenotherae (Cke. & Ell.) Sacc., leaf and cane spot. Md., Mo., Va.
Phoma sp., ?*P. idaei* Oud., also reported as *P. rubicola* Brun., on canes and spurs. Minn., N.Y. Conidial stage of *Didymella applanata*.
Phomopsis sp., on canes. Iowa.
Phragmidium rubi-idaei (DC.) Karst. (O,I,II,III), leaf rust, also cane and western rust. Northeastern and North Central States to Colo. and Pacific Northwest.
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Mich.
Phyllosticta sp. and *P. bicolor* Pk., on leaves. Fla., N.Y., Wash.
Phyllostictina carpogena Shear, fruit rot. Md.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on dead canes, ?blight. Iowa, Md., Mich., Mo., N.Dak., Pa.
Pucciniastrum americanum (Farl.) Arth. (II,III), late leaf rust. Northeastern States to N.C., Ill., and Idaho. O and I on *Picea glauca* (Moench) Voss (?*P. canadensis* (L.) B.S.P.)
Pyrenopeziza rubi (Fr.) Rehm, on dead canes. Calif., N.Dak.
Rhabdospora rubi Ell. (probably=*Cylindrosporium rubi* Ell. & Morg.), cane spot. Ala., Ill., N.J., Pa., Alaska.
Rhizoctonia solani Kuehn, root and collar rot. Colo., Idaho, Wash.
Rhizopus nigricans Ehr., black mold of fruit. Cosmopolitan.
Sclerotina sp. (*?S. sclerotiorum* (Lib.) d By.), cane blight. N.Y.
Septoria darrowi Zeller (=?*Cylindrosporium rubi*, q. v.), leaf spot. ?Md., N.C.
S. rubi West., leaf spot. Generally reported, but fungus on raspberry is probably not this but *Cylindrosporium rubi*, q. v. See also *Sphaerulina rubi*.
Sphaeropsis rubicola Cke. & Ell.: See *Physalospora obtusa*.
Sphaerotheca humuli (DC.) Burr., powdery mildew. Northeastern States to Ill. and Minn., Calif., and Pacific Northwest.
Sphaerulina intermixta (Berk. & Br.) Sacc., on canes. Oreg.
S. rubi Demaree & M. S. Wilcox, on overwintered leaves. Md., Mo., N.C. Shown to be the perfect stage of *Cylindrosporium rubi*, q. v.
Stigmatea rubicola (Ell. & Ev.) Th., black spot on canes and leaves. Mont., N. Mex., N.Y., Vt., Wis.
Valsa ambiens Pers. ex Fr., on dead canes. N.Dak., N.Y.
Verticillium albo-atrum Reinke & Berth., wilt. Oreg., N.Y.
Xylaria sp., root rot. Wash.

Decline disease—virus (*Corium ruborum* (Zeller & A. J. Braun) Holmes, Rubus virus 8 Zeller & A. J. Braun), on Cuthbert and other red varieties. Western part of Oreg.

Leaf curl—virus(es) (*Corium rubi* Holmes vars. *alpha* and *beta* Holmes, Rubus viruses 3 and 3A Bennett ex K.M.Sm.). General. The red raspberry is a common host, with indistinguishable symptoms, for the two varieties of the virus.

Mosaic, green mosaic, red raspberry mosaic—virus (*Marmor rubi* Holmes, Rubus virus 1 Rankin & Hockey ex K.M.Sm.). Pacific Northwest.

Yellow mosaic—virus (*Marmor rubi* Holmes, Rubus virus 2 Bennett ex K.M.Sm.). N.Y. to Md. and Wis., and probably in other raspberry districts.

Yellows—virus(es). "Yellows" applied to *Rubus* is an ambiguous term, not equivalent to yellow mosaic; probably a complex disease involving both types of mosaic and sometimes leaf curl.

Chlorosis—mineral deficiency, usually of iron, associated with alkaline soil. Western States.

B. Black

Rubus spp.

Species derived from *R. occidentalis* L., blackcap raspberry, including the amber-fruited var. *pallidus* Bailey, ranging from New England to Georgia, Colorado, and the Pacific Northwest; cultivated in zone 3, and from *R. leucodermis* Dougl., whitebark raspberry, occurring from Montana to Utah, central California, and Washington. Purplecane raspberries are hybrids of *R. occidentalis* and red raspberries; *R. neglectus* Pk. is a naturally occurring hybrid of this nature.

Agrobacterium rubi (Hildebrand) Starr & Weiss, cane gall. N.Y., Pa. to Ill. and Wis.; Oreg.
A. tumefaciens (E.F.Sm. & Town.) Conn, crown gall. General.
Armillaria mellea Vahl ex Fr., root rot. Oreg.
Ascospora ruborum Zeller, cane spot, dieback. Oreg.
Cercosporella rubi (Wint.) Plakidas, double blossom. Ky.
Clypeosphaeria hendersonia (Ell.) Sacc., on dead canes. N.J., T.H.
Coleroa chaetomium (Kunze) Rab. var. *americana* Petr., on leaves. Calif., Wash. *?Stigmatea rubicola* (Ell. & Ev.) Th.
Cryptostictis ludibunda Vest., on stems. Va., Vt.
Cylindrosporium rubi Ell. & Morg. (=*Sphaerulina rubi* Demaree & M. S. Wilcox), leaf spot. Common east of the Rocky Mountains; see note in section IIIA.
Didymella applanata (Niessl) Sacc., spur blight. Kans., Oreg., Pa., Wis.
Didymosphaeria manitobensis Ell. & Ev., on leaves. Mont.
Elsinoë veneta (Burkh.) Jenkins (*Sphaceloma necator* (Ell. & Ev.) Jenkins & Shear), anthracnose. Northeastern States to Md., Kans., and Pacific Northwest.
?Erwinia amylovora (Burr.) Winslow et al., flower and twig blight. Pa.
Gloeosporium allantosporum Fautr., anthracnose. Oreg., Wash.
Glomerella cingulata (Ston.) Spauld. & Schrenk, canker, dieback. Ky., Mich., Mo., Ohio.
Gnomonia rubi Rehm, on dead canes. Oreg.
Gymnoconia peckiana (Howe) Trott. (O,I,III), orange rust. Northeastern States to La. and Minn.; occasional in the Pacific Northwest.
Kuehneola uredinis (Lk.) Arth. (O,I,II,III), yellow rust. Del. to Mo. and Wis. Not recorded on this host by Arthur.
Kunkelia nitens (Schw.) Arth. (I), orange rust. Ill., Ind., Mich., Ohio.
Leptosphaeria coniothyrium (Fckl.) Sacc., cane blight. N.H. to Ga., Kans., and Wis.; Oreg.
Macrophoma conica Pass., on canes. Va.
Mycosphaerella confusa Wolf (*Cercospora rubi* Sacc.), leaf spot. Ala., Fla., Ga.
M. rubi Roark: See *Septoria rubi*.
Peronospora rubi Rab., downy mildew. Wash.
Pezizella oenotherae (Cke. & Ell.) Sacc., cane and leaf spot. Md., Ohio.
Phoma sp., cane blight. N.Y.
Phragmidium rubi-idaei (DC.) Karst. (O,I,II,III). yellow rust, sometimes on stems. Calif., Mass., Oreg., Wis.
Phyllosticta rubicola Rab., on leaves. Ind.
Pucciniastrum americanum (Farl.) (II,III), late rust. Northeastern States to Va., Iowa, and N. Dak.
Pyrenopeziza rubi (Fr.) Rehm, on dead canes. Oreg.
Rhabdospora ramealis (Desm. & Rob.) Sacc. (*Septoria rubi* West.), ?on twigs. Wash.

Septoria darrowi Zeller (=*Cylindrosporium rubi*, q.v.), leaf spot. Md.
S. rubi West., leaf spot. Vt. to S.C., Ark., and Nebr.; Wash. Probably should be *Cylindrosporium rubi*, q.v.
Sphaerotheca humuli (DC.) Burr., powdery mildew. Minn., N.Y., Ohio, Oreg., Wis.
Sphaerulina intermixta (Berk. & Br.) Sacc., on dead canes. Oreg.
Stigmatea rubicola (Ell. & Ev.) Th., black spot on canes and leaves. Md., Nebr., Wis.
Verticillium albo-atrum Reinke & Berth., wilt (western bluestem). Mass. to N.J. and Ohio; Oreg., Wash.
BROWN BERRY—virus undetermined. Ohio, Pa. According to Demaree it is different from mild streak with which it has been confused.
LEAF CURL—virus (*Corium rubi* Holmes var. *beta* Holmes, Rubus virus 3A Bennett ex K.M.Sm.). N.Y. to Pa., Ind., and Mich., and probably elsewhere.
MOSAIC, MILD—virus (*Marmor rubi* Holmes, Rubus virus 1 Rankin & Hockey ex K.M.Sm.). General.
STREAK, EASTERN BLUESTEM, ROSETTE—virus (*Nanus orientalis* Holmes, Rubus virus 4 Wilcox ex K.M.Sm.). Conn. to Md., Ill., and Wis.; Pacific Northwest. A mild and a severe form have been described but are thought to be caused by strains of one virus only; according to some they are distinct diseases.
YELLOW MOSAIC—virus (*Marmor rubi* Holmes, Rubus virus 2 Bennett ex K.M.Sm.). Ill., Md., Mich., N.Y., Ohio, Pa., Wash.; probably general.

C. Oriental species

Rubus spp.

Oriental species, such as *R. ellipticus* Sm., golden evergreen raspberry, *R. hawaiiensis* Gray, *R. phoenicolasius* Maxim., wineberry, and *R. rosaefolius* Sm., roseleaf raspberry; cultivated for fruit and ornament, chiefly in the South and sometimes naturalized in the American tropics.

Corticium galactinum (Fr.) Burt, root rot. Md., Va.
Irene calostroma (Desm.) Hoehn., black mildew. T.H.
Kuehneola uredinis (Lk.) Arth. (O,I,II,III), yellow rust. T.H.
Leptosphaeria coniothyrium (Fckl.) Sacc., cane blight. Va.
Mycosphaerella rubi Roark, leaf spot. Md. *Septoria darrowi* Zeller perhaps also present. SEE ALSO note in section IA.
Phomopsis rubiseda Fairm., on canes. N.Y.
Stictis hawaiiensis Cash, on living stems. T.H.
LEAF CURL—virus (*?Corium rubi* Holmes, Rubus virus 3 Bennett ex K.M.Sm.). N.Y.
MOSAIC—virus (*Marmor rubi* Holmes, Rubus virus 1 Rankin & Hockey ex K.M.Sm.). Oreg., Pa.

D. Flowering species

Rubus spp.

Flowering species, such as *R. odoratus* L., purple flowering raspberry, fragrant thimbleberry, in the Northeastern States to Georgia and Michigan, cultivated in zone 3; and *R. deliciosus* Torr., white flowering raspberry, boulder raspberry, in Colorado to Arizona and New Mexico, cultivated in zone 5.

Gnomonia rostellata (Fr.) Wehm., on canes. W.Va.
Leptosphaeria coniothyrium (Fckl.) Sacc., cane blight. Maine, W.Va.
Leptothyrium pomi (Mont. & Fr.) Sacc., flyspeck on canes. N.Y.
Monochaetia desmazierii Sacc., on leaves. Maine.
Pezicula rubi (Lib.) Niessl, on dead canes. Va.
Phomopsis rubiseda Fairm., on canes. N.Y.
Phragmidium peckianum Arth. (O,I,II,III), rust. Mont. to Ariz. and N. Mex. (on *R. deliciosus*).
P. rubi-odorati Diet. (O,I,II,III), rust. Maine to N.C. and Mich. (on *R. odoratus*).
Phyllosticta variabilis Pk., leaf spot. N.Y., Vt.
Physalospora obtusa (Schw.) Cke., on canes. N.Y.
Pyrenopeziza lacerata (Cke. & Pk.) Sacc., on dead canes. N.Y., W.Va.
Septoria rubi West.—Iowa.
Sphaerotheca humuli (DC.) Burr., powdery mildew, Northeastern States to Va. and Ohio.
LEAF CURL—virus (*?Corium rubi* Holmes, Rubus virus 3A Bennett ex K.M.Sm.). N.Y.
MOSAIC—virus (*?Marmor rubi* Holmes, Rubus virus 1 Rankin & Hockey ex K.M.Sm.). N.Y.

IV. Thimbleberries and Others

Rubus spp.

Shrubs native to North America, bearing edible fruit, sometimes grown for ground cover or ornament, not otherwise classified, such as (1) *R. chamaemorus* L., cloudberry, of northern New England to Alaska; (2) *R. parviflorus* Nutt., western thimbleberry, ranging from the Great Lakes to California and Alaska; (3) *R. pubescens* Raf. (*R. triflorus* Richards), dwarf red blackberry, New England to Alaska; and (4) *R. spectabilis* Pursh, salmonberry, of the northern Rocky Mountains to California and Alaska. The species are listed in the following only when specifically reported.

Aposphaeria major Syd., on stems. Utah.
Botrytis cinerea Pers. ex Fr., flower and shoot blight, gray mold of fruit. Alaska.
Coccomyces rubi (Fr.) Karst., on fallen leaves. Calif.
Gnomonia rostellata (Fr.) Wehm., on dead stems. Calif.
Gymnoconia peckiana (Howe) Trott. (O,I,III), orange rust. Maine, N.H., Wis. (3).
Hypoderma virgultorum (Pers. ex Fr.) DC., on dead stems. Alaska.
Kuehneola uredinis (Lk.) Arth. (O,I,II,III), yellow rust. Mass., Mich., N.Y. (3).
Kunkelia nitens (Schw.) Arth., orange rust (I). Calif. (2); Va. (3).
Leptosphaeria coniothyrium (Fckl.) Sacc., canker, blight. Mass., Va.
Leptothyrium clypeosphaerioides Sacc., on dead stems. Alaksa.
Marssonina potentillae (Desm.) Magn. var. *tormentillae* Trail, leaf spot. Wis.
Mycosphaerella rubi Roark, leaf spot. On various species, Wis. to Calif. and Alaska.
Nectria cinnabarina Tode ex Fr., on stems, coral spot. Alaska.
Phragmidium occidentale Arth. (O,I,II,III), rust. Mich. to N. Mex., Wash., and Alaska. (2).
P. rubi-idaei (DC.) Karst. (O,I,II,III), rust. Oreg. and Wash. (4).
Phyllosticta dearnessii Sacc., on leaves. N.Y. (3).
Pucciniastrum arcticum (Lagh.) Tranz. (II,III), rust. Alaska, New England to Minn. (3).
Pyrenopeziza rubi (Fr.) Rehm, on dead stems. Calif.
Synchytrium aureum Schroet., leaf gall. Wis. (3).
MOSAIC—virus (?*Marmor rubi* Holmes, Rubus virus 1 Rankin & Hockey ex K.M.Sm.). Oreg.

Sanguisorba

(1) *S. canadensis* L., American burnet.

(2) *S. stipulata* Raf. (*S. sitchensis* C. A. Mey.), Sitka burnet.
(3) Other species.

Perennial herbs of meadows and bogs: (1) in the Northeastern States to Georgia; (2) in the Pacific Northwest to Alaska; wildlife-food plants and sometimes grown for ornament.

Graphium sessile Dearn. & House, leaf spot. N.Y. (1).
Ovularia bulbigera (Fckl.) Sacc., leaf spot. Ill. (1), Alaska (2).
Podosphaera oxyacanthae (DC.) d By., powdery mildew. Iowa (1).
Sphaerotheca humuli (DC.) Burr., powdery mildew. Mass., N.Y., Pa. (1); Alaska (3).
Xenodochus carbonarius Schlecht. (I,III), rust. Alaska (3).
X. minor Arth. (III), rust. Alaska (2).

Sorbus

(1) *S. americana* Marsh., American mountain-ash, including *S. decora* (Sarg.) Schneid., showy mountain-ash.

Small, smooth-barked trees of range 23,24, 26,27; furnish food for wildlife and are cultivated for ornament, zone 2.

(2) *S. aucuparia* L., European mountain-ash, rowantree.

Attractive small tree of Europe and western Asia, occurring in several botanical varieties, cultivated for ornament, zone 2, and locally naturalized in the Eastern and Central States.

(3) *S. sitchensis* Roem., Pacific mountain-ash, including *S. occidentalis* (S. Wats.) Greene, western mountain-ash.

Shrubs or small trees of range 4 and 12, *S. sitchensis* in Alaska and Yukon also; sometimes planted for ornament.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Conn., N.J. (1,2).
Alternaria sp., leaf spot. Iowa (1).
Armillaria mellea Vahl ex Fr., root rot. N.J. (1).
Coryneum sorbi Pk., on twigs. Calif. (3).
Cytospora spp., canker, dieback. Species reported include: *C. leucostoma* Sacc.—Mont. (1); *C. massariana* Sacc.—Idaho (1); *C. microspora* (Cda.) Rab.—Mont. (1). SEE ALSO *Eutypella* and *Valsa*.
C. chrysosperma Pers. ex Fr., canker, dieback. Mont., Nebr. (1,3); Minn., N.J., Wash. (1); Colo. (3).
C. rubescens Fr., trunk canker. Iowa (2). Conidial stage of *Eutypella sorbi*, q. v.
Dermatea ariae (Pers. ex Fr.) Tul. (*Micropera cotoneastri* (Fr.) Sacc.), on twigs. Mich., N.Y., Pa. (1).
Diaporthe impulsa (Cke. & Pk.) Sacc., on branches. Mass., Mich., N.H., N.Y. (1); Calif. (3).
Dothiorella pyrenophora Sacc., on branches. Kans., R.I. (1).
D. scopulina Dearn. & Barth., on branches. Wyo. (3).
Entomosporium maculatum Lév. var. *cydoniae* Sacc., leaf spot. Wis. (2).
E. maculatum var. *domesticum* Sacc. (*?Fabraea maculata* Atk.), leaf spot. Wis. (1).
Erwinia amylovora (Burr.) Winslow et al., fire blight. Widespread, Tex. (1); N.Y. (2).
Eutypella sorbi (Schm. & Kunze) Sacc. (*Cytospora rubescens* Fr.), on branches. Mont. (1,3), Colo. (3).
Excipulina pallida (Pk.) Dearn. & House, on branches. N.Y., Wis. (1).
Fabraea maculata Atk., leaf blight. Alaska (3).
Fusicladium dendriticum (Wallr.) Fckl. and var. *orbiculatum* Sacc.: SEE *Venturia inaequalis*.
Gloeodes pomigena (Schw.) Colby, on twigs. Ind. (1).
Glomerella cingulata (Ston.) Spauld. & Schrenk, branch canker, fruit rot. Ind. (1.
Graphium sorbi Pk., leaf spot. N.Y., Wis. (1).
Gymnosporangium aurantiacum Chev. (O,I), rust. Maine to N.J. and Wis. (1); Conn., Mich., N.J. (2); Mont. to Colo., Wash., and Alaska (3). III on *Juniperus communis* L. var. *depressa* Pursh.
G. globosum Farl. (O,I), rust. Northeastern States (1). III on *Juniperus virginiana* L.
G. juniperinum (L.) Mart. (O,I), rust. Mont. to Colo., Wash., and Alaska (3). III on *Juniperus communis* var. *depressa*.
G. libocedri (P. Henn.) Kern (O,I), rust. Oreg. (2). III on *Libocedrus decurrens* Torr.
G. nelsoni Arth. (O,I), rust. Mont., Wash., Wyo. (3). III on *Juniperus* spp.
G. nootkatense (Trel.) Arth. (O,I), rust. Oreg., Wash., Alaska (3). III on *Chamaecyparis nootkatensis* (Lamb.) Spach
Nectria cinnabarina Tode ex Fr., coral spot, twig blight. N.C. (1), Alaska (3).
Nummularia discreta (Schw.) Tul., blister canker. Iowa (1,2); Mass., Minn., W.Va. (1).
N. repanda (Fr.) Nits., on branches. Pa. (1).
Phomopsis sp., twig blight. Mass. (1).
Phyllosticta globigera Sacc., leaf spot. Idaho, Wash. (3).
P. sorbi West., leaf spot. Ill., Maine, Mo., Okla., Tex. (1); Iowa (1,2). Probably might=*Mycosphaerella aucupariae* (Lasch) Laibach.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Physalospora obtusa (Schw.) Cke., black rot, canker. Conn. to Va. and Mich., Tex. (1); Ind., Ohio (2).
Podosphaera oxyacanthae DC. ex d By. var. *tridactyla* Wallr., powdery mildew. Wash. (2).
Polyporus hirsutus Wulf. ex Fr., white heart rot. Mich., Wash. (1).
P. versicolor L. ex Fr., wound rot. Wis. (1).
Pseudopeziza pyri Pk., on leaves. N.Y. (1).
Ramularia destruens Pk., on leaves. N.Y. (1).
Rhabdospora inaequalis Sacc., on twigs. Alaska (3).
Septoria sitchensis Dearn., leaf spot. Idaho (3).
S. sorbi Lasch, leaf spot. Iowa (2). (=*Mycosphaerella aucupariae*).
Sphaeronema pallidium Pk.: SEE *Excipulina pallida*.
Thyridaria sorbi Dearn. & House, on branches. N.Y. (1).
Valsa spp., on twigs and branches, sometimes causing cankers and dieback. Species reported include: *V. massariana* de N.—Idaho (1); and *V. sordida* Pers. ex Fr.—Widespread (1).
V. leucostoma Pers. ex Fr., twig blight, canker. Mont., N.Y. (1); Ohio, W.Va. (2).
Venturia inaequalis (Cke.) Wint. apud Thuem., scab. Ill. (2).
V. inaequalis var. *cinerascens* (Fckl.) Aderh., scab. Ill., Minn., N.Y., Wash. (1).

ERINEUM — epidermal proliferation caused by mites. Alaska (1).

Spiraea

I. Exotic Species

Spiraea spp., spirea.

Exotic flowering shrubs, mostly oriental, commonly cultivated for ornament, such as *S. cantoniensis* Lour., *S. chamaedryfolia* L., *S. japonica* L. f., *S. prunifolia* Sieb. & Zucc., *S. thunbergii* Sieb., and *S. trilobata* L.; also

hybrids, such as *S. bumalda* Burvenich, *S. vanhouttei* (Briot) Zabel; mostly hardy in zone 4.

Agrobacterium rhizogenes (Riker et al.) Conn, hairy root. Iowa.
Cylindrosporium filipendulae Thuem., leaf spot. Iowa, Oreg., Wash., Wis.
Diaporthe viburni Dearn. & Bisby var. *spiraeicola* Wehm., on twigs. N.Y.
Diplodia spiraeicola Ell. & Ev., on twigs. N.Y.
Erwinia amylovora (Burr.) Winslow et al., fire blight. Md., N.C., N.J., Tex., Va.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Heterosporium spiraeae Syd., on leaves. Alaska.
Meloidogyne spp., root knot nematodes. Fla., Miss.
Microsphaera alni DC. ex Wint., powdery mildew. Conn.
Mycosphaerella sp., on leaves. Alaska.
Phomopsis spiraeae (Desm.) Grove, on twigs. Md.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Physalospora obtusa (Schw.) Cke., on twigs. Ga.
Podosphaera oxyacanthae DC. ex d By., powdery mildew. Widespread.
P. ?leucotricha (Ell. & Ev.) Salm.—On *S. bumalda* in Calif.
Septoria salicifolia (Trel.) Ell. & Ev.—Tex.
Sphaerotheca humuli DC. ex Burr.—Tex.

II. Native or Escaped Species

Spirea spp., spirea.

Shrubs: native, such as *S. alba* Du Roi, meadowsweet. *S. latifolia* (Ait.) Borkh., meadowsweet, and *S. tomentosa* L., hardhack, steeplebush, in the Eastern and Central States, and *S. douglasii* Hook. and *S. menziesii* Hook. of the Pacific Coast States; or introduced from Europe and escaped, such as *S. salicifolia* L., willowleaf spirea. Sometimes grown for ornament and for hybridizing with other ornamental forms.

Ascochyta salicifoliae Trel.: SEE *Phleospora salicifoliae*.
Belonidium spiraeae Dearn. & House, on dead twigs. N.Y.
Cercospora rubigo Cke. & Harkn., leaf spot. Calif., Kans., Oreg., Wis.
Cryptodiaporthe macounii (Dearn.) Wehm., on twigs, ?canker. N.Y.
Cylindrosporium spp., leaf spot. Species reported include: *C. fairmanianum* Sacc.—N.Y.; *C. salicifoliae* (Trel.) J. J. Davis (=*Phleospora salicifoliae*, q.v.); *C. spiraeicola* Ell. & Ev.—Idaho.
Diaporthe viburni Dearn. & Bisby var. *spiraeicola* Wehm., on twigs. Mass.
Gnomonia papillostoma Dearn. & House, on leaves. N.Y.
Phleospora salicifoliae (Trel.) Petr., leaf spot. N.Y. to Kans., Tex., and Wash. Reported under various names, such as *Ascochyta salicifoliae* Trel., *Cylindrosporium salicifoliae* (Trel.) J. J. Davis, *Septoria salicifoliae* (Trel.) Ell. & Ev.; the *Septoria* name has been generally used in the U. S.
Physalospora obtusa (Schw.) Cke., on twigs. N.Y.
Podosphaera oxyacanthae DC. ex d By., powdery mildew. Widespread; Iowa, N.Y.
P. oxyacanthae var. *tridactyla* (Wallr.) Salm.—Wash.
Ramularia spiraeae Pk., on leaves. N.Y.
Septoria salicifoliae (Trel.) Ell. & Ev.: SEE *Phleospora salicifoliae*.
Sphaerotheca humuli DC. ex Burr., powdery mildew. Conn., Mich., N.Y., Pa.
S. humuli DC. ex Burr. var. *fuliginea* (Schlecht.) Salm. (*S. castagnei* Lév.), powdery mildew. Pa.
Sporodesmium spiraeicola Cke., on leaves. S.C.
Thelephora terrestris Ehr. ex Fr., stem girdle of seedlings. Idaho.

Stranvaesia

S. davidiana Decne., Chinese stranvaesia.

Large evergreen shrub of China, cultivated for ornament, zone 7.

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Erwinia amylovora (Burr.) Winslow et al., fire blight. N.J.

Waldsteinia

W. fragarioides (Michx.) Tratt., barren-strawberry.

Perennial creeping herb of woodlands of the Northeastern and North Central States to Georgia, sometimes planted in rock gardens.

Gnomonia waldsteiniae Dearn. & House, on leaves and petioles. N.Y.
Puccinia waldsteiniae Curt. (III), rust. Mich., N.Y., Vt., Wis.; also on *W. idahoensis* Piper in Idaho.
Ramularia waldsteiniae Ell. & J. J. Davis, leaf spot. Wis.
Septoria waldsteiniae Pk. & G. W. Clint., leaf spot. Mich., N.Y., Vt.
Whetzella waldsteiniae (Pk.) Zundel (*Urocystis waldsteiniae* Pk.), leaf smut. N.Y., Wis.

RUBIACEAE

Borreria

Borreria spp., especially *B. laevis* (Lam.) Griseb., *B. ocimoides* (Burm. f.) DC., and *B. verticillata* (L.) Meyer.

Asterula tracyi Pk., on leaves. Miss.
Cercospora borreriae Ell. & Ev., leaf spot. Miss.
Meliola amphigena F. L. Stevens & Tehon, black mildew. C. Z.
M. psychotriae Earle, black mildew. P.R.
Puccinia lateritia Berk. & Curt. (III), rust. Fla., P.R., V.I.
Uredo borreriae (P.Henn.) Kern & Whet. (II), rust. P.R.

Bouvardia

Bouvardia spp.

Small, attractive shrubs, cultivated under glass; *B. ternifolia* (Cav.) Schlecht. occurs in southwestern United States.

Aphelenchoides fragariae (Ritz.-Bos) Christie—U. S., no place specified.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. N.Y.
Puccinia bouvardiae Griff. (O,I,III), rust. Ariz.
P. lateritia Berk. & Curt. (III), rust. P.R.

Cephalanthus, buttonbush

C. occidentalis L.

Ornamental shrub of range 3,4,5,11,16,17, 19 through 30.

Ascochyta cephalanthi Ell. & Ev., leaf spot. La., Tex.

Botryosphaeria ribis Gross. & Dug., on dead stems. Fla.
Cercospora cephalanthi Ell. & Kell.: See *Ramularia cephalanthi.*
C. perniciosa Heald & Wolf, leaf blight. Tex.
Coniothyrium cephalanthi Ell. & Ev., leaf spot. La.
Cuscuta compacta Juss., dodder. Fla.
C. gronovii Willd., dodder. N.Y.
Dendrophoma cephalanthi Pk., on dead branches. N.Y.
Diatrypella cephalanthi (Schw.) Sacc., on dead branches. N.Y., Okla.
Godronia cephalanthi (Schw. ex Fr.) Dearn. & House, on bark. Ala., N.Y.
Massarina plumigera (Ell. & Ev.) Sacc. & Trott. var. *tetraspora* Dearn. & House, on dead shoots. N.Y.
Microsphaera alni DC. ex Wint., powdery mildew. Widespread.
Pellicularia koleroga Cke., thread blight. Fla.
Pestalotia sp.—Tex.
Phoma cephalanthi P. Henn., on dead stems. N.Y.
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Ind.
Phyllosticta cephalanthi Tharp, leaf spot. Tex.
Physalospora obtusa (Schw.) Cke., on dead stems. Ga., Va.
Polyporus dichrous Fr., *P. gilvus* Schw. ex Fr., *P. radiatus* Sow. ex Fr. var. *cephalanthi* Overh., on dead stems. Lower Mississippi Valley.
P. illinoiensis Baxter—Ill., Mich.
Puccinia seymouriana Arth. (O,I), rust. Southern New England to Fla. and Central States. II and III on *Spartina* spp.
Ramularia cephalanthi (Ell. & Kell.) Heald, leaf spot. Ala., Kans., La., N.Y., Wis.
Rhabdospora verruciformis (Berk. & Cke.) Sacc., on dead stems. Ala.
Septoria cephalanthi Ell. & Kell., leaf spot. Kans., Wis.
Stereum rameale Schw. ex Burt, on dead stems. Lower Mississippi Valley, Okla.
Tympanis cephalanthi Dearn. & House, on dead twigs. N.Y.
Uredo cephalanthi Arth. (II), rust. Fla.
Xylaria arbuscula Sacc.—Ga.

Chiococca

C. alba (L.) Hitchc., snowberry.

Shrub of tropical America and southern Florida.

Irenopsis chiococcae F. L. Stevens, black mildew. P.R.
Meliola psychotriae Earle, black mildew. P.R.
Phyllachora noblei Chardon, on leaves. P.R.
Triposporium stelligerum Speg., on leaves. P.R.

Cinchona

Cinchona spp., especially *C. calisaya* Wedd. and *C. officinalis* L.

Trees and shrubs of South America, sometimes cultivated in southern United States as ornamentals; its bark the source of quinine.

Cercospora cinchonae Ell. & Ev., leaf spot. La.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.
Rosellinia sp., gray root rot. P.R.
Root and collar rot—complex disease of seedlings, probably caused by *Phytophthora* sp. P.R.

Coffea

C. arabica L., common or Arabian coffee.

Evergreen shrub of tropical Asia and Africa, cultivated extensively in South and Central America and less so in the West Indies, also occasionally as an ornamental in the Southern States; seeds called "berries" or "beans." The transfer of coffee culture from Malaya and the Philippines to the Western Hemisphere was due to the depredations of the rust, *Hemileia vastatrix* Berk. & Br., introduced from Africa; this disease is unknown in the Americas.

The following records include a few reports on *C. liberica* Hiern and *C. laurentii* De Wild. (*C. robusta* Linden) which are infrequently cultivated here.

Capnodium spp., sooty mold. General. Grows on insect secretions but causes secondary effects on plants.
Cephaleuros virescens Kunze, algal spot. P.R.
Cephalosporium sp., zonal leaf spot. P.R.
Cercospora coffeicola Berk. & Cke. (*Cercosporina coffeicola* (Berk. & Cke.) Speg.), brown spot, eyespot of leaves and berries. General.
Colletotrichum coffeanum Noack, anthracnose, brown blight, dieback. General. Also reported as a conidial stage of *Glomerella cingulata*, q.v.
Fusarium bulbigenum Cke. & Mass. var *coffeae* Alvarez Garcia, black root, wilt. PR.
F. lateritium Nees, twig blight. P.R. Conidial stage of *Gibberella baccata* (Wallr.) Sacc.
F. moniliforme Sheldon, seedling blight. P.R. Conidial stage of *Gibberella fujikuroi* (Saw.) Wr.
Gloeosporium coffeanum Del.: See *Collectotrichum coffeanum.*
Glomerella cingulata (Ston.) Spauld. & Schrenk (*Colletotrichum coffeanum* Noack), leaf spot, dieback. General.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. T.H., tropical America.
Omphalia flavida (Cke.) Maubl. & Rangel (*Mycena citricolor* (Berk. & Curt.) Sacc., *Stilbella flavida* (Cke.) Henn.), viruela, iron spot, American leaf disease. West Indies, C.Z., Central America.
Pellicularia koleroga Cke., thread blight. P.R., tropical America.
Rhizoctonia solani Kuehn, damping-off. Cosmopolitan.
Rosellinia bunodes (Berk. & Br.) Sacc., secondary root rot. Tropical America. Follows *Fusarium* in P.R. but does not attack healthy roots.
Scolecopeltis longispora (Earle) Toro, on leaves. P.R.

Duggena

Duggena spp.

Shrubs and small trees of tropical America, sometimes cultivated as ornamentals.

Meliola duggenae F. L. Stevens and *M. duggenae* var. *panamensis* F. L. Stevens, black mildew. C.Z.
M. psychotriae Earle—P.R.
Wageria portoricensis F. L. Stevens & Dalbey, on leaves. P.R.

Ernodea

Ernodea spp.

Vinelike shrubs of littorals, southern Florida and the West Indies.

Puccinia lateritia Berk. & Curt. (III), rust. Fla., P.R., V.I.

Galium, bedstraw

(1) *G. aparine* L., spring-cleavers, goosegrass.
(2) *G. boreale* L., northern bedstraw.

(3) *Galium pilosum* Ait.
(4) *G. tinctorium* L. (*G. claytoni* Michx.)
(5) *G. triflorum* Michx., sweet-scented bedstraw.
(6) Other species.

One common annual weed (1) and several native, slender perennial herbs (2,3,4,5,6) of wide distribution in the United States; minor food plants for wildlife; some of the introduced species are grown for ornament.

Cercospora galii Ell. & Holw., leaf spot. Iowa, Oreg., Wis. (1); Ala. (3); N.Y. (4); Oreg., Wis., Alaska (5); Iowa, N.H., Wis. (6).
C. tenuis Pk.—N.Y. (3).
Cuscuta cuspidata Engelm., dodder. Tex. (1).
Erysiphe cichoracearum DC., powdery mildew. Frequent on (1) throughout its range; Calif., Mont., Oreg. (5); Calif., Pa., Wash. (6).
E. polygoni DC.—Kans. (1).
Hainesia borealis Ell. & Ev., on leaves. Ind., Wash. (2). Probably a conidial stage of *Pseudopeziza repanda*, q.v.
Melasmia galii Ell. & Ev., leaf spot. Iowa (2).
Peronospora calotheca d By., downy mildew. Del. to Fla., Kans., and Wis. (1); Iowa, N. Dak., Wis. (2); Wis. (5,6). The form on (1) is sometimes distinguished as *P. aparines* (d By.) Gäum.; on (2) as *P. borealis* Gäum.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (6).
Physalospora galii Rostr., on stems. N. Mex. (2), Oreg. (5).
Placosphaeria punctiformis (Fckl.) Sacc. Conidial stage of the following, q.v.
Pseudopeziza repanda (Fr.) Karst., leaf and stem spot. Oreg. (1,2); Ill., Iowa, N. Dak., Wis. (2); Conn., Ga. (3); N.Y., Wis. (4); Calif., Oreg. (5); Pa., Wis. (6).
Puccinia difformis G. Kunze (O,I,III), rust. Ohio to Kans. and Mont., also Pacific coast (1).
P. punctata Lk. (O,I,II,III). Calif., Oreg., Wash., Wyo., Ill. (?), Mich., Miss., Wis. (1); N.C. (3); N. Dak. to Calif. and Wash. (5); also on other species in this range and to Conn. and Miss.
P. punctata var. *troglodytes* (Lindr.) Arth. (II,III). Conn. to Mo. and S.Dak., and Wash. (5). O and I unknown.
P. rubefaciens Johans. (III). Iowa and Wis. to Calif. and Wash., Alaska (2); Calif. (6).
Pucciniastrum galii (Lk.) E. Fisch. (II,III), rust. N.Y. and Pa. to Wis., Colo., Calif., and Oreg. (5). O and I unknown.
Rhabdospora galiorum (Ell.) Dearn. & House, on stems. N.J. (1,6), N.Y. (6).
Septoria aparine Ell. & Kell., on leaves and stems. Kans. (1), Wis. (6).
S. cruciatae Rob. & Desm. (*S. psilostega* Ell. & G. Martin), leaf spot. Wis. (1); N.J. (3); Ind., Mich., N.Y., W.Va., Wis. (6).
Sporonema punctiforme (Fckl.) Hoehn.: See *Pseudopeziza repanda.*
Uromyces galii-californici Linder, (II,III), rust. Calif. (6). O and I are unknown.

Gardenia

G. jasminoides Ellis (*G. florida* L.), cape-jasmine, gardenia.

Flowering evergreen shrub of China, cultivated in the open in the Southern States and California and extensively under glass for the fragrant, camellia-like cut flowers. The horticultural forms (*G. fortunei* Hort. and *G. veitchii* Hort.) are derived from the var. *fortuniana* Lindl.

Botrytis cinerea Pers. ex Fr., bud rot of greenhouse plants. See Bud drop.
Capnodium spp., sooty mold. Gulf States.
Cephaleuros virescens Kunze, algal spot. Gulf States, P.R.
Erysiphe polygoni DC., powdery mildew. Tex.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. General.
Mycosphaerella gardeniae Cke., on leaves. Ga.
Phomopsis gardeniae Hansen & Barrett, canker, stem gall. Calif., and widespread on greenhouse plants.
Phyllosticta sp., leaf spot. Miss., N.J., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pseudomonas gardeniae (Burkh. & Pirone) Dows., bacterial leaf spot. N.J.
Rhizoctonia sp., leaf spot. N.J.
Sphaerella gardeniae Cke. (*Phyllosticta gardeniae* Cke.), on leaves. S.C.
Xanthomonas maculifolium-gardeniae (Ark & Barrett) Elliott, bacterial leaf spot. Calif.

Bud drop—physiogenic, often due to excessive soil moisture and to temperature fluctuations; sometimes ascribed to bacterial or *Botrytis* infection of buds but this is probably secondary. Widespread in greenhouse culture.

Chlorosis—physiogenic, unfavorable soil reaction (pH too high); may also be due to low soil temperature in greenhouse culture.

Genipa

G. americana L.

A forest tree of tropical America, its fruit used in preserves.

Amazonia tehoni Toro—P.R.
Asterina genipae Ryan, black spot. P.R.
Phyllachora genipae F. L. Stevens & Dalbey—P.R.

Gouldia

Gouldia spp.

Tropical shrubs or trees, several species of which are planted as ornamentals in Hawaii.

Amazonia asterinoides (Wint.) Th., black mildew. T.H.
Asterina gouldiae F. L. Stevens & Ryan, black leaf spot. T.H.
Cercospora sp., leaf spot. T.H.
Dendrophoma gouldiae F. L. Stevens & Plunkett, on leaves. T.H.
Enthalopycnidium gouldiae F. L. Stevens, on leaves. T.H.
Meliola kaduae F. L. Stevens and *M. sandwicensis* Ell. & Ev., black mildew. T.H.
Mycosphaerella kaduae F. L. Stevens & Young, on leaves. T.H.
Pluriporus gouldiae F. L. Stevens & Ryan, black leaf spot. T.H.
Septoria gouldiae F. L. Stevens & Young and *S. hawaiiensis* F. L. Stevens & Plunkett, leaf spot. T.H.
Sphaeropsis gouldiae F. L. Stevens & Plunkett, on leaves. T.H.
Trichopeltis reptans Speg., on leaves. T.H.

Hamelia

Hamelia spp., especially *H. patens* Jasq. (*H. erecta* Jacq.), scarlet-bush.

Evergreen shrubs or small trees of tropical

America including southern Florida; cultivated for ornament.

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Meliola psychotriae Earle, black mildew. C.Z.
Uredo hameliae Arth. (II), rust. P.R.

Houstonia

(1) *H. caerulea* L., bluets.
(2) *H. longifolia* Gaertn.
(3) *H. purpurea* L.
(4) Other species.

Small, mostly perennial herbs of the Eastern and Southern States; sometimes grown in wild and rock gardens; sometimes perennating and useful as a ground cover.

Cercospora houstoniae Ell. & Ev., leaf spot. Del. (1).
Peronospora calotheca d By., downy mildew. Ill. (1).
P. seymourii Burr.—Miss. (1); Ala., Ark., Ill., Ind., Iowa, Tex. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).
Puccinia lateritia Berk. & Curt. (III), rust. Tex. (4).
Septoria sp., leaf spot. Tex. (4).
Uromyces houstoniatus (Schw.) Sheldon (O,I), rust. Mass. to Miss., Mo., and Ill. (1); N.Y., Pa., Wis., W.Va. (2); Miss., Tenn., W.Va. (3); Kans., N.C., Tex. (4). II and III on *Sisyrinchium* spp.
U. peckianus Farl. (O,I), rust. Miss. (3,4); Ala., Tex. (4). II and III on *Aristida* and *Distichlis*.

Ixora

Ixora spp.

Tropical evergreen shrubs or small trees; some species grown for ornament in Florida and the West Indies.

Asterina ixorae Ryan, black leaf spot. P.R.
Asterinella ixorae Ryan, black leaf spot. P.R.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla.

Mitchella

M. repens L., partridgeberry, squawberry.

A trailing evergreen herb of eastern North America; a wildlife-food plant, sometimes grown in wild gardens and used for ground cover.

Meliola mitchellae Cke., black mildew. Ala., Fla., Miss., Pa.
Microthyrium mitchellae Cke., on leaves. Fla.
Sclerotium rolfsii Sacc., stem rot. Md.

Morinda

M. royoc L., royoc, Indian-mulberry.

Branching shrub, native of Florida.

Cercospora morindicola Jenkins & Chupp—Fla.
Sphaceloma morindae Bitanc. & Jenkins—Fla.

Palicourea

Palicourea spp.

Shrubs or trees of tropical America grown for ornament in the Far South.

Asterina miconicola Ryan, black leaf spot. P.R .
Irenina seminata (Berk. & Curt.) F. L. Stevens (*Meliola glabra* Berk. & Curt. var. *psychotriae* F. L. Stevens), black mildew. P.R.
Meliola mayagueziana F.L.Stevens—P.R.
Ophionectria palicoureae Seaver & Whet., on leaves. P.R.
Puccinia fallax Arth. (II,III), rust. P.R.
Rosellinia bunodes (Berk. & Br.) Sacc., root rot. P.R.

Psychotria

Psychotria spp., wild-coffee.

Tropical shrubs or small trees; *P. nervosa* Sw., balsamo, and *P. undata* Jacq., occur in southern Florida and the West Indies, sometimes planted for ornament.

Asterina acanthopoda Speg. and *A. psychotriae* Ryan, black patch. P.R.
Irenina seminata (Berk. & Curt.) F. L. Stevens, black mildew. P.R.
I. isertiae F. L. Stevens, black mildew. C.Z.
Irenopsis bayamonensis (Tehon) F. L. Stevens, black mildew. P.R.
Microthyrium psychotriae (Doidge) Toro, black patch. P.R.
Omphalia flavida (Cke.) Maubl. & Rangel (*Mycena citricolor* (Berk. & Curt.) Sacc.), leaf spot. P.R.
Puccinia fallax Arth. (II,III), rust. P.R.

Randia

R. mitis L., inkberry.

Shrub or small tree of the West Indies, the fruit used for dye.

Aecidium abscedens Arth. (O,I), rust. P.R.
A. pulverulentum Arth. (O,I), rust. On *R. spinosa* L. in C.Z.
Elsinoë puertoricensis Jenkins & Bitanc., on fruits, stems, and leaves. P.R.
Meliola psychotriae Earle, black mildew. P.R.
Trabutia randiae (Rehm) Th. & Syd., tar spot. P.R.

Richardia

R. scabra L., Mexican-clover.

Annual herb of the Gulf States and tropical America, grown as a cover and forage crop.

Cercospora carveriana Sacc. & D. Sacc. (?*C. richardsoniae* P. Henn.), leaf spot. Ala.
Fusarium oxysporum Schlecht. f. *batatas* (Wr.) Snyd. & Hans., in roots and stems. S.C.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Fla., T.H.
Peronospora sp., downy mildew. Fla.
Phyllosticta richardsoniae Ell. & Ev., leaf spot. Ala.
Phytophthora cinnamomi Rands and *P. parasitica* Dast., root and stem rot. T.H.
Rhizoctonia solani Kuehn, root rot. Fla.
Sclerotium rolfsii Sacc., southern blight. Fla.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). T.H.

Rondeletia

Rondeletia spp.

Large-flowered, evergreen shrubs or trees; some species grown for ornament in tropical America, or under glass.

Echidnodella rondeletiae Ryan, black leaf spot. P.R.
Morenoella decalvans (Pat.) Th. var. *rondeletiae* Ryan, on leaves. P.R.

RUTACEAE

Citrus

C. aurantifolia (Christm.) Swingle, lime.

Small, glaborous tree with stiff, sharp spines; cultivated in southern California and southern Florida; endemic and cultivated throughout the West Indies; the fruit very acid.

Corticium salmonicolor Berk. & Br., pink disease. West Indies.
Cuscuta americana L., branch gall. Fla.
Diaporthe citri Wolf, gummosis, melanose, Phomopsis rot of fruit, dieback, stem-end rot. Widespread.
Diplodia natalensis P. Evans, Diplodia rot, charcoal rot, dieback, gummosis, stem-end rot. General.
Elsinoë fawcetti Bitanc. & Jenkins, scab. Fla., West Indies, T.H.
Gloeosporium limetticola Clausen, anthracnose, withertip. Calif., Fla., P.R., T.H. Restricted to West Indian variety.
Glomerella cingulata (Ston.) Spauld. & Schrenk, associated with anthracnose and withertip. General.
Penicillium digitatum Sacc., green mold. Cosmopolitan.
P. italicum Wehmer, contact mold. Cosmopolitan.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora rhodina (Berk. & Curt.) Cke.: See *Diplodia natalensis.*
Phytophthora citrophthora (R.E.Sm. & E.H.Sm.) Leonian, brown rot of fruit, brown rot gummosis. P.R., T.H.
P. parasitica Dast., collar rot, "mal di gomma." Fla., West Indies.
Pseudomonas syringae Van Hall, blast. Calif.
Sphaeropsis tumefaciens Hedges, branch knot. Fla., West Indies.
Sphaerostilbe repens Berk. & Cke., associated with red root disease. West Indies. Occurred in the Lesser Antilles only; recent work has shown the disease to be due to erratic water supply; *S. repens* is not parasitic.
Tylenchulus semi-penetrans Cobb, in roots. Fla.

Dieback—physiogenic, associated with irregular moisture supply. West Indies.
Leprosis—cause unknown; symptoms only on leaves; perhaps caused by mites *(Brevipalpus* sp.). Fla.
Red root—primarily physiogenic with accessory fungi. West Indies.
Stylar end-rot—physiogenic. Calif., Fla. Especially on Persian (Tahiti) variety.

Citrus aurantium L., sour, or Seville, orange.

Glabrous tree, medium in size, cultivated chiefly for rootstocks; naturalized in Florida; cultivated in southern Europe for making marmalade.

Alternaria citri Ell. & Pierce, black rot of fruit. Widespread.
Armillaria mellea Vahl ex Fr., root rot. Calif.
Botryosphaeria ribis Gross. & Dug., dieback, gummosis. Calif., Gulf States.
Corticium koleroga (Cke.) Hoehn.: See *Pellicularia koleroga.*
Cuscuta americana L., dodder. Fla.
Diaporthe citri Wolf., melanose, Phomopsis rot, dieback. Gulf States.
Diplodia natalensis P. Evans, Diplodia rot, gummosis, twig blight, stem-end rot. General.
Elsinoë fawcetii Bitanc. & Jenkins, scab. Ala., Fla., La., Miss., Tex., Guam, T.H., West Indies.
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, withertip. General.
Leptosphaeria bondari Bitanc. & Jenkins, on leaves. P.R.
Mycosphaerella lageniformis Rehm, on leaves. Calif.
Omphalia flavida (Cke.) Maubl. & Rangel *(Mycena citricolor* (Berk. & Curt.) Sacc.), leaf spot, iron spot. P.R.
Pellicularia koleroga Cke., thread blight. Fla., P.R.
Penicillium spp., blue and green molds. Cosmopolitan.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora rhodina (Berk. & Curt.) Cke.: See *Diplodia natalensis.*
Phytophthora citrophthora (R.E.Sm. & E.H.Sm.) Leonian, brown rot, gummosis (resistant). Calif.
P. parasitica Dast., foot rot (resistant). Fla., P.R.
Sphaeropsis tumefaciens Hedges, branch knot. Fla.
Tylenchulus semi-penetrans Cobb, in roots. Fla.
Psorosis—virus *(Rimocortius psorosis* (Fawcett) Holmes); symptoms only on foliage. Calif.
Exanthema—copper deficiency. Calif., Fla.
Leprosis—cause unknown; perhaps caused by mites, *(Brevipalpus* sp.). Fla.

Citrus grandis (L.) Osbeck: See *C. paradisi.*

Citrus limon (L.) Burm. f., lemon; including rough lemon.

Small, glabrous tree; cultivated chiefly in southern California and Arizona; the fruit very sour. Rough lemon, a var. of *C. limon,* used as a rootsock and also naturalized in Florida.

Alternaria citri Ell. & Pierce (possibly other *Alternaria* or *Pleospora* spp.), center rot, stylar-end rot, leaf spot. Calif., Fla.
Armillaria mellea Vahl ex Fr., mushroom root rot. Calif., Tex.
Botryosphaeria ribis Gross. & Dug., Dothiorella rot of fruit, gummosis, trunk canker, stem-end rot. Calif.
Botrytis cinerea Pers. ex Fr., gray mold of fruit, gummosis. Calif.
Diaporthe citri Wolf, melanose, Phomopsis rot of fruit, gummosis, stem-end rot. Calif., Fla.; also causes shell-bark or decorticosis in Calif.
Diplodia natalensis P. Evans, Diplodia rot, dieback, gummosis. General.
Elsinoë fawcetti Bitanc. & Jenkins, scab, verrucosis. Gulf States, West Indies.
Exosporina fawcetti E. E. Wilson, branch wilt, canker. Calif.
Glomerella cingulata (Ston.) Spauld. & Schrenk *(Colletotrichum gloeosporioides* Penz.), anthracnose, withertip. General.
Macrophomina phaseoli (Maubl.) Ashby, root rot. Ariz., Calif.
Penicillium digitatum Sacc., green mold; *P. italicum* Wehmer, blue or contact mold; *P. roseum* Lk., pink mold. Cosmopolitan.
Phyllosticta hesperidearum (Catt.) Penz., on leaves. Fla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora rhodina (Berk. & Curt.) Cke.: Perfect stage of *Diplodia natalensis,* q.v.
Phytophthora citrophthora (R.E.Sm. & E.H.Sm.) Leonian, brown rot of fruit, brown rot gummosis, collar rot. Calif., P.R.
P. parasitica Dast., brown rot of fruit, foot rot, "mal di gomma." Calif., Fla.
Poria vaporaria (Pers. ex Fr.) Cke., root rot. Calif.
Sclerotinia sclerotiorum (Lib.) d By., cottony fruit rot, gummosis, root rot. Calif., Tex.
Septoria citri Pass., leaf and fruit spot. Calif.
S. limonum Pass., fruit spot. Calif.

Tryblidiella rufula (Spreng.) Sacc., twig blight. Tex.
COLLAPSE—?virus. Occurs in lemons grown on grapefruit stock. Calif.
CRINKLY LEAF—virus, possibly psorosis virus, q.v., or a strain or variety of psorosis virus, or a mixture with another virus. Calif.
INFECTIOUS VARIEGATION—virus. Associated with crinkly leaf and possibly a symptom of the latter. Calif.
PSOROSIS—virus *(Rimocortius psorosis* (Fawcett) Holmes). Calif. Only foliage symptoms.
CHLOROSIS—mineral deficiency induced by excess lime. Calif., Tex.
CRINKLY LEAF—if localized, probably a bud variation; if systemic, probably virus. See above under CRINKLY LEAF, virus.
DRY BARK—severe form of shell bark, q.v.
ENDOXEROSIS (internal decline of fruit, yellow tip)—adverse moisture conditions during growth. Calif.
GUMMOSIS AND WOOD NECROSIS—?parasitic. Tex.
LEPROSIS—cause unknown; perhaps caused by mites *(Brevipalpus* sp.). Fla.
MEMBRANOUS STAIN, MEMBRANOSIS (of stored fruit)—physiogenic. Calif.
MOTTLE LEAF, FOLIOCELLOSIS—zinc deficiency. Calif.
OLEOCELLOSIS—(rind-oil stain of fruit).—Attributed to lack of ventilation and unequal temperatures during refrigeration.
PETECA (pitting of stored fruit)—low temperature, suboxidation.
RED BLOTCH, ADUSTIOSIS (of fruit)—deficient ventilation in storage.
SHELL BARK—cause unknown; not *Diaporthe citri*, however. Calif.
SILVERING—rust-mite *(Phyllocoptruta)* and thrips injury on fruit.
"WOOD POCKET"—genetic or perhaps virus abnormality. Calif. In one strain of Lisbon variety.

Citrus maxima (Merr.) var *uvacarpa* Merr. & Lee. See *C. paradisi.*

Citrus nobilis Lour., King orange; including records for *C. nobilis* var. *unshiu* Swingle, Satsuma orange; *C. reticulata* Blanco (*C. nobilis* var. *deliciosa* (Ten.) Swingle) mandarin orange, tangerine; and *C. paradisi* Macf. × *C. reticulata*, tangelo.

Small trees, cultivated chiefly in the Gulf States and California; the sweet fruit separating easily into segments.

Alternaria citri Ell. & Pierce, black rot of fruit. Widespread.
Cercospora aurantia Heald & Wolf, leaf spot. Miss.
Clitocybe tabescens (Scop. ex Fr.) Bres., mushroom root rot. Fla.
Diaporthe citri Wolf, melanose, Phomopsis rot, dieback. Widespread.
Diplodia natalensis P. Evans, Diplodia rot, dieback, gummosis. General.
Elsinoë fawcetti Bitanc. & Jenkins, scab. Gulf States.
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, withertip. Tex.
Nematospora coryli Pegl., dry rot of fruit. Calif., Fla.
Oidium tingitaninum C. N. Carter, powdery mildew. Calif.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on twigs and branches. Occasional.
P. rhodina (Berk. & Curt.) Cke.: SEE *Diplodia natalensis.*
Phytophthora citrophthora (R.E.Sm. & E.H.Sm.) Leonian, brown rot of fruit, brown rot gummosis. Calif.
P. parasitica Dast., brown rot of fruit, foot rot. Calif., Fla.
P. syringae Kleb., leaf blight, brown rot of fruit. Calif.
Pythium spp., secondary root rot. Calif. *P. ultimum* Trow is most frequent; other species include: *P. debaryanum* Hesse, *P. irregulare* Buis., and *P. vexans* d By.
Tylenchulus semi-penetrans Cobb, in roots. Fla.
PSOROSIS—virus *(Rimocortius psorosis* (Fawcett) Holmes). Calif.
EXANTHEMA—copper deficiency. Fla.
GREASY SPOT (of foliage)—cause unknown. Fla.

Citrus paradisi Macf. (*C. maxima* Merr. var. *uvacarpa* Merr. & Lee), grapefruit; including also records for *C. grandis* (L.) Osbeck, pummelo.

The cultivated grapefruit: *C. paradisi*, a hardy tree, much grown in the United States; fruit borne in clusters and having finely grained flesh; *C. grandis*, a tender tree, cultivated chiefly in Florida, Texas, Arizona, and California; the fruit mostly smooth and pale yellow, the flesh coarse-grained.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Tex.
Alternaria citri Ell. & Pierce, fruit rot. Ariz.
Botryosphaeria ribis Gross. & Dug., Dothiorella rot, stem-end rot. Calif., Fla., Tex.
Botrytis cinerea Pers. ex Fr., gummosis. Calif.
Cercospora aurantia Heald & Wolf, leaf spot. Tex.
Chaetothyrium hawaiiense Mendoza, on leaves. Fla.
Clitocybe tabescens (Scop. ex Fr.) Bres., mushroom root rot. Fla.
Colletotrichum gloeosporioides Penz.: SEE *Glomerella cingulata.*
Corticium koleroga (Cke.) Hoehn.: SEE *Pellicularia koleroga.*
Corticium salmonicolor Berk. & Br., pink disease. P.R.
Cuscuta americana L., dodder. Fla.
Diaporthe citri Wolf., melanose, Phomopsis rot, bark disease, gummosis, stem-end rot. Widespread.
Diplodia natalensis P. Evans, Diplodia rot, gummosis, twig blight, stem-end rot. General.
Elsinoë fawcetti Bitanc. & Jenkins, scab. Gulf States, C.Z., West Indies.
Exosporina fawcetti E. E. Wilson, branch wilt, canker. Calif.
Fusarium sp., dry rot of fruit. Ariz.; root rot. P.R.
Gloeodes pomigena (Schw.) Colby, sooty blotch. Fla.
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, withertip. General.
Leptothyrium pomi (Mont. & Fr.) Sacc., flyspeck. Fla.
Oospora citri-aurantii (Ferr.) Sacc. & Syd., sour rot. Occasional.
Nematospora coryli Pegl., dry rot of fruit. Calif., Fla.
Penicillium digitatum Sacc., green mold. Cosmopolitan.
P. italicum Wehmer, blue mold. Cosmopolitan.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora fusca N. E. Stevens, on twigs. Fla.
P. rhodina (Berk. & Curt.) Cke.: Perfect stage of *Diplodia natalensis*, q.v.
Phytophthora citrophthora (R.E.Sm. & E.H. Sm.) Leonian, brown rot of fruit, brown rot gummosis. Ariz., Calif., Fla., P.R.
P. palmivora Butl., blight of nursery plants. P.R.
P. parasitica Dast., brown rot of fruit, foot rot. "mal di gomma." Calif., Fla.
Pseudomonas syringae Van Hall, blast. Calif.
Rhizoctonia solani Kuehn, damping-off. P.R.
Sclerotinia sclerotiorum (Lib.) d By., cottony fruit rot. Calif.

Sclerotium rolfsii Sacc., seedling blight, fruit rot. Gulf States (Tex.); P.R.
Septobasidium spongium (Berk. & Curt.) Pat., felt fungus canker. P.R.
Septoria citri Pass., leaf and fruit spot. Calif.
Sphaeropsis tumefaciens Hedges, branch knot. Fla.
Tryblidiella rufula (Spreng.) Sacc., on twigs. P.R.
Tylenchulus semi-penetrans Cobb, in roots. Ariz., Calif., Fla.

"CRAZY TOP" and "BLUE ALBEDO"—suspected virus. Ariz. Probably related to stubborn disease of sweet orange in Calif.
PSOROSIS—virus *(Rimocortius psorosis* (Fawcett) Holmes). Calif., Fla., Tex.
BLOTCH OF FRUIT—cause unknown. Fla.
BUCKSKIN (of fruit)—rust-mite (*Phyllocoptruta*) injury. Fla.
EXANTHEMA—copper deficiency. Fla.
GREASY SPOT (of foliage)—cause unknown. Fla., West Indies.
GUMMOSIS AND WOOD NECROSIS—?parasitic. Tex.
LEPROSIS—cause unknown (resistant): perhaps caused by mites, *(Brevipalpus* sp.). Fla.
LUMPY RIND, GUM POCKETS—cause unknown. Fla., P.R.
MOTTLE LEAF, FRENCHING—zinc deficiency. Calif., Fla.
OLEOCELLOSIS (rind-oil stain of fruit).
PITTING, or POX (of stored fruit)—low temperature, ?suboxidation.
SCALD (of stored fruit)—low temperature, suboxidation.
SILVER SCURF (of fruit)—thrips injury.
TEAR STAIN (of fruit)—rust-mites and fungi.
WATERY BREAKDOWN (of stored fruit)—low temperature, overmaturity.
WILT, BLIGHT—deficient or irregular water supply. Fla.
YELLOW SPOT (of foliage)—cause unknown, possibly related to greasy spot. Fla.

Citrus reticulata Blanco: See *C. nobilis*.

Citrus sinensis (L.) Osbeck, common, or sweet, orange.

Medium-sized tree, cultivated chiefly in Florida, Texas, Arizona, California; the common, familiar orange with sweet pulp.

Alternaria citri Ell. & Pierce, black rot of fruit, navel end rot, possibly a factor in June drop. Widespread; Tex.
Armillaria mellea Vahl ex Fr., mushroom root rot. Calif.
Botryosphaeria ribis Gross. & Dug., Dothiorella rot, stem-end rot. Calif.
Botrytis cinerea Pers. ex Fr., fruit rot, gummosis. Calif.
Candelospora citri Fawc. & Klotz, fruit rot. Calif., Fla.
Cercospora aurantia Heald & Wolf, leaf spot. Tex.
Clitocybe tabescens (Scop. ex Fr.) Bres., mushroom root rot. Fla.
Corticium koleroga (Cke.) Hoehn.: SEE *Pellicularia koleroga*.
Corticium salmonicolor Berk. & Br., pink disease. P.R.
Cuscuta americana L., dodder
Diaporthe citri Wolf, melanose, Phomopsis rot, dieback, bark disease, stem-end rot. Widespread.
Diplodia natalensis P. Evans, Diplodia rot, dieback, collar rot, gummosis, stem-end rot. General.
Elsinoë fawcetti Bitanc. & Jenkins, scab (practically immune). Fla.
Exosporina fawcetti E. E. Wilson, on frost-injured twigs. Calif.
Fusarium spp., fruit rot, root rot, twig blight. See under *Citrus* spp.
Glomerella cingulata (Ston.) Spauld. & Schrenk *(Colletotrichum gloeosporioides* Penz.), antharenose, withertip. General.
Nematospora coryli Pegl. and *N. gossypii* Ashby & Nowell, dry rot of fruit. Widespread.
Oospora citri-aurantii (Ferr.) Sacc. & Syd., sour rot. Occasional.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora rhodina (Berk. & Curt.) Cke.: SEE *Diplodia natalensis*.
Phytophthora citrophthora (R.E.Sm. & E.H.Sm.) Leonian, brown rot of fruit, brown rot gummosis. Calif., Gulf States, P.R.
P. parasitica Dast., brown rot of fruit, foot rot, "mal di gomma." Calif., Fla., Tex., P.R.
P. syringae Kleb., brown rot of fruit, leaf blight. Calif.
Pseudomonas syringae Van Hall, blast, black pit of fruit. Calif.
Pythium ultimum Trow, rootlet rot and tree decline. Calif.
Sclerotinia sclerotiorum (Lib.) d By., cottony fruit rot, twig blight. Calif.
Sphaeropsis tumefaciens Hedges, branch knot. Fla.
Tylenchulus semi-penetrans Cobb, in roots. Calif., Fla.
CONCAVE GUM PSOROSIS—virus (*Rimocortius psorosis* (Fawcett) Holmes var. *concavum* Fawcett & Bitanc.). Calif.
CORKY BARK—suspected virus(es). Calif. Various forms reported: necrotic-cavity, crumbly-gum, banded, circular-spot, tattoo-netted. Possibly related to psorosis group, at least some forms.
KNOBBY BARK—suspected virus. Calif.
PSOROSIS—virus (*Rimocortius psorosis* (Fawcett) Holmes). Ariz., Calif., Fla., Tex., P.R.
QUICK DECLINE—virus. Southern Calif. Occurs only in sweet orange tops on sour orange *(C. aurantium)* roots. Very similar to tristeza virus in South America; virus probably closely related or perhaps a strain.
"STUBBORN" or "ACORN" DISEASE—suspected virus. Affects Washington navel oranges in Calif. A fruit abnormality known as "pink nose" is related. The disorders called "crazy top" and "blue albedo" in grapefruit, occurring in Arizona, are probably of the same nature.
BROWN SPOT OF NAVEL ORANGES—immaturity of fruit when picked. Calif.
CHLOROSIS—mineral deficiency induced by excess lime. Calif., Tex.
CREASING, PUFFING—fruit abnormality associated with slow growth and overmaturity.
EXANTHEMA—copper deficiency. Calif., Fla., Tex.
GRANULATION (SCLEROCYTOSIS) OF FRUIT)—physiological; overmaturity. Calif. Affects the juice sacs in fruit of Valencia orange in Calif.
GREASY SPOT—Tex.
GUMMOSIS AND WOOD NECROSIS—?parasitic. Tex.
JUNE DROP—physiogenic, adverse moisture and temperature conditions. Calif.
LEPROSIS—cause unknown; perhaps caused by mites, (*Brevipalpus* sp.). Fla.
LUMPY RIND—fruit abnormality, cause unknown. Fla.
MINERAL-NUTRIENT DEFICIENCIES—from field observations at least occasional deficiencies of nitrogen, iron, zinc, manganese, and copper, perhaps also potassium and phosphorus, occur in California citrus plantings.
MOTTLE LEAF, FOLIOCELLOSIS, FRENCHING—zinc deficiency. Calif., Fla.
OLEOCELLOSIS—(rind-oil stain of fruit).
PITTING, or POX (of stored fruit)—low temperature, suboxidation.
RUSSETING (of fruit)—citrus rust mite (*Phyllocoptruta oleivora* (Ashm.). Other manifestations of this injury are known locally as buckskin, sharkskin, and tear stain.
SILVER SCURF (of fruit)—feeding injury by thrips. Widespread.

STIGMONOSE (of foliage)—insect punctures. Calif., Fla.

VALENCIA RIND SPOT—physiogenic; excess of moisture during ripening. Calif.

WATER SPOT—physiogenic; water suffusion of white portion of rind. Calif.

WILT, BLIGHT—physiogenic; deficient or irregular water supply. Fla.

Citrus trifoliata L. SEE *Poncirus trifoliata.*

Citrus spp.

Diseases occurring on *Citrus* spp. in general or on undetermined species.

Aegerita webberi Fawc., parasitic on larvae of whitefly ?(*Trialeurodes vaporariorum* Westw.). Fla., West Indies.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall, ?branch knot. Ariz., Calif. Its natural occurrence questioned; difficult to inoculate.

Alternaria citri Ell. & Pierce, black rot, center rot, blossom-end rot, ?leaf spot. Widespread. *A. tenuis* Auct. also reported, probably identical. According to Fawcett and Bliss, *A. citri* is distinct from *A. tenuis* although it may belong in the *A. tenuis* group.

Armillaria mellea Vahl ex Fr., mushroom root rot. Calif.

Aschersonia aleyrodis Webber and *A. goldiana* Sacc. & Ell., parasitic on scale insects and whitefly larvae, often prominent on leaves and twigs. Fla., West Indies.

A. turbinata Berk., parasitic on wax scale insects. Fla., La.

Ascochyta sp., gummosis, wood rot. Calif.

Aspergillus alliaceus Thom & Church, *A. flavus* Lk., *A. niger* v. Tiegh., fruit rot, usually after prolonged storage. Occasional.

Atichia dominicana Cotton, on scale insects. West Indies.

Botryosphaeria ribis Gross. & Dug. (*Dothiorella ribis* (Fckl.) Sacc.), Dothiorella rot, bark canker, gummosis, stem-end rot. Widespread.

Botrytis cinerea Pers. ex Fr., gray mold of fruit, chiefly lemon. Occasional; gummosis and twig blight. Calif.

Calonectria diploa (Berk. & Curt.) Wr., parasitic on scale insects. Gulf States.

Capnodium spp. (*C. citri* Berk. & Desm., *C. citricola* McAlp., and other species), sooty mold. Gulf States and West Indies. Saprophytic on insect exudate but having indirect effects on foliage and fruit.

Cassytha filiformis L., dodder-like plant. Fla.

Cephaleuros virescens Kunze, algal leaf spot, "red rust." Gulf States, West Indies.

Cephalosporium lecanii Zimm., parasitic on scale insects. Fla., West Indies.

Cercospora spp. (*C. aurantia* Heald & Wolf, *C. fumosa* Penz.), on leaves. Fla., Tex.

Cladosporium citri Mass.: SEE *Elsinoë fawcetti.*

Cladosporium herbarum Lk. var. *citricola* Farl., associated with scaly bark (see LEPROSIS) and fruit blemish; probably secondary. Gulf States.

Clitocybe tabescens (Scop. ex Fr.) Bres., mushroom root rot. Fla.

Colletotrichum gloeosporioides Penz.: SEE *Glomerella cingulata.*

Coprinus atramentarius Fr., (secondary) root rot. Calif.

Corticium koleroga (Cke.) Hoehn.: SEE *Pellicularia koleroga.*

Corticium salmonicolor Berk. & Br., pink disease, rubellosis. P.R.

Cuscuta spp., dodder. On seedlings, especially grapefruit, in Ariz., Calif., Fla., West Indies.

C. americana L.—On *Citrus* spp. in Fla. Earlier reports limited this to the Antilles.

C. boldinghii Urb., on orange. Fla.

C. gronovii Willd. var. *latiflora* Engelm.

C. subinclusa Durand & Hilgard, on orange. Calif.

Daldinia concentrica (Bolt. ex. Fr.) Ces. & de N. and *Daldinia* spp., wood rot. Occasional.

Dendropemon spp., mistletoe. West Indies.

Diaporthe citri Wolf (*Phomopsis californica* Fawc., *P. caribaea* Horne, *P. citri* Fawc.) melanose of fruit and foliage, Phomopsis rot, decorticosis, gummosis, shell bark (chiefly of lemon), tear stain of fruit, stem-end rot. General. According to Wehmeyer, *D. citri* is a host form of *D. medusaea* Nits.

Diplodia natalensis P.Evans, Diplodia rot, twig blight, collar rot, gummosis. General. A synonym of *Diplodia* (*Botryodiplodia*) *theobromae* (Pat.) Nowell and a widely used name for forms of *Diplodia* on citrus, some of which have a perfect stage in *Physalospora rhodina*, q. v.

Dothiorella spp., chiefly the following, possibly including other species, cause stem-end rot, dieback, gummosis. Widespread.

D. ribis (Fckl.) SEE *Botryosphaeria ribis.*

Elsinoë fawcetti Bitanc. & Jenkins (*Sphaceloma fawcettii* Jenkins), scab, verrucosis, sour orange scab. Gulf States, West Indies, Central America. (The specific epithet of the conidial stage was published "*fawcettii*," that of the ascigerous stage "*fawcetti*.")

Eutypella citricola Speg., on dead twigs. Fla.

Fusarium spp., associated with various pathological conditions, as follows:

Fruit rot—*F. avenaceum* (Fr.) Sacc. and *F. orthoceras* Appel & Wr.—Calif., Tex., West Indies.

Gummosis and twig blight—*F. lateritium* Nees (conidial stage of *Gibberella baccata* (Wallr.) Sacc.) and *F. solani* (Mart.) Appel & Wr.—Calif., Fla. In collar rot and foot rot (see *Phytophthora citrophthora* and *P. parasitica*) *F. lateritium* (*F. limonis* Briosi) is often present as a secondary invader.

Parasitic on scale insects—*F. coccophilum* (Desm.) Wr. (conidial stage of *Nectria coccophila* (Tul.) Wr.), *F. juruanum* P.Henn. (conidial stage of *Calonectria diploa* (Berk & Curt.) Wr.), and *F. scirpi* Lambotte & Fautr. (*F. aleyrodis* Petch)—Gulf States.

Root rot—*Fusarium* spp., frequently *F. solani* but nonpathogenic. Ariz., Calif., Fla., P.R.

Ganoderma lucidum (Leyss. ex Fr.) Karst., trunk rot. Fla., West Indies.

Gibberella baccata (Wallr.) Sacc., on twigs. Calif.

Gloeodes pomigena (Schw.) Colby, sooty blotch of fruit. Gulf States.

Gloeosporium spp., anthracnose, withertip. General. Most of the many named species on *Citrus* are probably synonyms of *Colletotrichum gloeosporioides* Penz.

G. limetticola Clausen, lime anthracnose, withertip. Fla., West Indies.

Glomerella cingulata (Ston.) Spauld. & Schrenk (*Colletotrichum gloeosporioides* Penz.), anthracnose (stain, spot, or rot of fruit), withertip. General.

Hendersonula toruloidea Nattrass, gummosis, wood rot, fruit rot. Calif.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Leptosphaeria bondari Bitanc. & Jenkins, ?areolate leaf spot. P.R. According to Stahel, areolate leaf spot is caused by *Corticium areolatum* Stahel and *Leptosphaeria bondari* is saprophytic. This *Corticium* has not been identified in P.R., the only source of a record of this disease within our territory.

Leptothyrium pomi (Mont. & Fr.) Sacc., flyspeck of fruit. Gulf States, West Indies.

Macrophomina phaseoli (Maubl.) Ashby, root rot. Ariz., Calif., West Indies.

Meliola camelliae (Catt.) Sacc., *M. citri* (Briosi & Pass.) Sacc., and *M. penzigi* Sacc.: SEE *Capnodium* spp.

Meloidogyne sp., root knot nematodes. Occasional.

Mucor paronychia Suth.-Camp. & Plunkett, and *M. racemosus* Fres., fruit rot. Calif.

Mycosphaerella lageniformis Rehm, leaf spot. Calif.

Myriangium floridanum Hoehn., parasitic on scale insects, also causes a fruit speck. Calif., Gulf States, West Indies.

Nectria coccophila (Tul.) Wr., parasitic on scale insects. Fla., West Indies.

N. diploa Berk. & Curt. (?*Sphaerostilbe aurantiicola* (Berk. & Br.) Petch)—Fla.

Nematospora coryli Pegl. and *N. gossypii* Ashby & Nowell, inspissosis (dry rot) of fruit, associated with insect punctures. Widespread.

Oidium tingitaninum C.N.Carter and *Oidium* sp., powdery mildew. Calif., ?Fla., West Indies.

Omphalia flavida (Cke.) Maubl. & Rangel (*Mycena citricolor* (Berk. & Curt.) Sacc.), leaf spot. P.R.

Oospora citri-aurantii (Ferr.) Sacc. & Syd. (*Oosporoidea citri-aurantii* (Ferr.) Sumstine), sour rot. Cosmopolitan.

Penicillium spp., including *P. digitatum* Sacc., green mold; *P. italicum* Wehmer, blue or contact mold; *P. roseum* Lk., pink mold; *P. stoloniferum* Thom. On all citrus fruits, cosmopolitan in distribution.

Pestalotia guepini Desm., on twigs. Gulf States, West Indies.

Phoma socia Wolf, secondary in lesions of bacterial canker. Gulf States. See note under *Xanthomonas citri*.

Phomopsis spp., including *P. californica* Fawc., *P. caribaea* Horne, and *P. citri* Fawc.: SEE *Diaporthe citri*.

Phoradendron sp., mistletoe. Gulf States, West Indies.

Phyllosticta spp., including *P. aurantiicola* (Berk. & Cke.) Sacc., *P. erratica* Ell. & Ev., *P. hesperidearum* (Catt.) Penz., and *P. longispora* McAlp., on leaves. Gulf States, West Indies.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Physalospora fusca N.E.Stevens and *P. obtusa* (Schw.) Cke., on twigs and branches. Calif., Gulf States.

P. rhodina (Berk & Curt.) Cke. (*Diplodia natalensis* P.Evans), Diplodia rot, stem-end rot, gummosis, wood rot. General.

Phytophthora cinnamomi Rands—Calif.

P. citrophthora (R.E. & E.H.Sm.) Leonian (*Pythiacystis citrophthora* R.E. & E.H.Sm.), brown rot gummosis or collar rot, brown rot of fruit, leaf blight, root rot. Ariz., Calif., Fla., La., P.R., T.H.

P. megasperma Drechs., root rot. Calif.

P. palmivora Butl., leaf and stem blight. P.R.

P. parasitica Dast., foot or collar rot, gummosis, "mal di gomma," brown rot of fruit. Calif., Fla., Gulf States, West Indies.

P. syringae Kleb., leaf blight, brown rot of fruit. Calif. Wager combines *P. hibernalis* Carne with *P. syringae;* as distinct species, cf. Klotz and Fawcett "Handbook."

Pleospora sp. (?*P. media* Niessl var. *limonum* Sacc.) leaf spot. Calif.

P. herbarum (Pers. ex Fr.) Rab., dry black rot of fruit. Calif.

Podonectria coccicola (Ell. & Ev.) Petch, parasitic on scale insects. Fla., West Indies.

Polyporus spp., including *P. adustus* Willd. ex Fr., *P. gilvus* Schw. ex Fr., *P. hirsutus* Wulf. ex Fr., *P. lignosus* Kl., and *P. versicolor* L. ex Fr., wound rot and trunk rot, secondary. Occasional.

Poria ambigua Bres.—Calif.

P. cocos Wolf, on roots. Fla.

P. vaporaria (Pers. ex Fr.) Cke., root rot. Calif.

Pseudomonas syringae Van Hall (*Bacterium citriputeale* C.O.Sm.), blast (leaf and twig blight), black pit of fruit, chiefly of lemon. Calif.

Pythium spp., damping-off, rootlet rot. Species reported include: *P. debaryanum* Hesse, *P. rostratum* Butl., *P. ultimum* Trow, and *P. vexans* d By.—Calif. *P. debaryanum* and *P. ultimum* also may cause a soft brown rot of fruit.

Rhizoctonia solani Kuehn, damping-off, occasionally fruit rot. Cosmopolitan.

Rhizopus nigricans Ehr., black mold rot of fruit. Occasional.

Rosellinia bunodes (Berk. & Br.) Sacc. and *R. pepo* Pat., black root. West Indies.

Schizophyllum commune Fr., wood rot, occasionally on living trees. Cosmopolitan.

Sclerotinia sclerotiorum (Lib.) d By., cottony fruit rot, root rot, twig blight. Calif., Tex.

Sclerotium rolfsii Sacc., seedling blight, fruit rot. Gulf States, P.R.

Septobasidium spp., including *S. lepidosaphis* Couch, *S. pseudopedicellatum* Burt, and *S. spongium* (Berk. & Curt.) Pat., felt fungus. Gulf States, West Indies.

Septoria citri Pass., leaf and fruit spot. Calif., Tex.

Sphaceloma fawcettii Jenkins: SEE *Elsinoë fawcetti*.

Sphaeropsis coccophila Tul.: SEE *Nectria coccophila*.

Sphaeropsis repens Berk. & Br., on roots, associated with red root disease but not proved pathogenic.

S. tumefaciens Hedges, branch knot, witches'-broom. Fla., West Indies, ?T.H.

Sporotrichum citri (Butl.) Doidge & Butl. (?*Sphaceloma fawcettii*): SEE *Elsinoë fawcetti*.

Stemphylium citri Patterson & Charles, end rot of fruit. Ariz. (=*Alternaria citri*).

Torula dimidiata Penz., gummosis following winter injury. Calif.

Trametes hydnoides Sw. ex Fr. and *T. hispida* Bagl., wood rot. Calif.

Trichoderma viride Pers. ex Fr. (*Hyprocrea rufa* Fr.), fruit rot, chiefly on lemon. Occasional.

Tylenchulussemi-penetrans Cobb, in roots. Ariz., Calif., Fla., West Indies.

Ustulina vulgaris Tul., following foot rot. Fla., P.R.

Xanthomonas citri (Hasse) Dows., bacterial canker. Introduced into the Gulf States but completely eradicated.

PSOROSIS, CALIFORNIA SCALY BARK—virus (*Rimocortius psorosis* (Fawcett) Holmes). General. Besides the type psorosis A, or common scaly bark, three other forms are recognized: psorosis B, or ring type (*R. psorosis* var. *annulatum* Fawcett), causing gummosis of twigs and trunks and ring spot on fruit and leaves and resembling zonate chlorosis of Brazil; concave-gum psorosis (*R. psorosis* var. *concavum* Fawcett & Bitanc.); and blind-pocket psorosis (*R. psorosis* var. *alveatum* Fawcett & Bitanc.). Possibly includes crinkly leaf (in part) and infectious variegation of lemon.

BLIGHT, WILT—physiogenic, probably due to deficit or excess of soil moisture. Fla.

BORON DEFICIENCY—physiogenic. Calif., Fla.

BORON TOXICITY—physiogenic; causes tip blight of foliage. Calif.

BRONZING—magnesium deficiency. Fla.

BUCKSKIN—rust-mite (*Phyllocoptruta*) injury on grapefruit and oranges. Fla.

CHLOROSIS—iron deficiency induced by excess of lime or lack of organic matter. Ariz., Calif., Fla.

CHLOROSIS, MARL CHLOROSIS—manganese deficiency. Fla. In Calif. it is attributed to iron deficiency in soils that are high in CO_3 and moisture.

EXANTHEMA, "AMMONIATION" DIEBACK—excrescences on twigs and fruit and dying back of the twigs; primarily a copper deficiency but augmented by exces-

sive nitrogen fertilization and bad drainage. Calif., Fla.

GREASY SPOT, "BLACK MELANOSE," (of leaves)—cause unknown; chiefly on grapefruit, sometimes on sweet orange. Calif., Tex., West Indies.

GUM SPOT (of foliage)—physiogenic, probably environmental injuries.

GUMMOSIS (of trunk, branches, and fruit)—in part physiogenic, associated with adverse site conditions; associated with wood necrosis; perhaps due to parasitic action (?*Actinomyces*); perhaps caused by mites, *Brevipalpus* sp.

LEPROSIS, FLORIDA SCALY BARK, "NAILHEAD RUST" (of fruit)—cause unknown; perhaps caused by mites (*Brevipalpus* sp.). Fla. (Lepra explosiva and variola, as used in Argentina, are the same.)

MOTTLE LEAF, FOLIOCELLOSIS, FRENCHING—zinc deficiency. Ariz., Calif., Fla.

OLEOCELLOSIS (rind-oil spot)—chemical injury from release of oil in rind.

SILVER SCURF—thrips injury on fruit. Widespread.

SILVERING—rust-mite (*Phyllocoptruta oleivora* (Ashm.)) injury on lemons. Fla.

STIGMONOSE—leaf spots induced by insect punctures. Occasional.

TEAR STAIN (of fruit)—rust-mite injury followed by fungi. Occasional.

WILT—See BLIGHT.

Clausena

C. lansium (Lour.) Skeels, wampi.

Small tree, native of China, sometimes cultivated as an ornamental in Florida.

Elsinoë fawcetti Bitanc. & Jenkins, scab. Fla.
Glomerella cingulata (Ston.) Spauld. & Schrenk (*Gloeosporium clausenae* Patterson), leaf spot. Md.
Tylenchulus semi-penetrans Cobb, in roots. Fla.

Feronia

F. limonia (L.) Swingle, wood-apple.

Small, deciduous tree of southeast Asia, cultivated for fruit and as an ornamental in Florida.

Xanthomonas citri (Hasse) Dows., canker. Fla. Also reported on the related *Feroniella lucida* Swingle in Fla. Subsequently eradicated.

Fortunella

F. margarita (Lour.) Swingle, and other species, kumquat.

Trees or shrubs of China, cultivated for fruit and as ornamentals in Gulf States and California; fruit pulp acid, skin biting.

Alternaria citri Ell. & Pierce, black rot. Calif.
Cephaleuros virescens Kunze, algal leaf spot. Gulf States.
Cuscuta campestris Yunck., dodder. Fla.
Diaporthe citri Wolf, stem-end rot. Calif.
Phoma socia Wolf, on twigs. Ala.
Phyllosticta citricola Hori, leaf spot. Miss.
Physalospora rhodina (Berk. & Curt.) Cke., on branch. Fla.
Tylenchulus semi-penetrans Cobb, in roots. Fla.
Xanthomonas citri (Hasse) Dows., canker. Ala. Eradicated.

Microcitrus

M. virgata Hort.

Small evergreen tree of Australia, introduced into the United States for testing as citrus stock.

Tylenchulus semi-penetrans Cobb, in roots. Md.

Poncirus

P. trifoliata (L.) Raf. (*Citrus trifoliata* L.), hardy orange.

Small, spiny, deciduous tree, native of northern China but naturalized in range 17,20,29,30; used as a rootstock for Satsuma oranges and cultivated for hedges as an ornamental.

Diaporthe citri Wolf, melanose, dieback. Gulf States.
Diplodia natalensis P.Evans, dieback, gummosis. General.
Elsinoë fawcetti Bitanc. & Jenkins, scab. Miss.
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, dieback. Gulf States.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on twigs. Gulf States.
P. rhodina (Berk. & Curt.) Cke.: SEE *Diplodia natalensis.*
Xanthomonas citri (Hasse) Dows., canker. Introduced and formerly occasional in La. and Tex., now completely eradicated.
Xylaria polymorpha (Pers. ex. Fr.) Grev., root rot. La.

Ptelea

P. trifoliata L., hoptree.

Large, deciduous shrub or small tree of range 11,16,17,20,22,23,24,25,27,28,29; grown for ornament, zone 4.

Cercospora afflata Wint., leaf spot. Ind., Mo., Tex.
C. pteleae Wint., leaf spot. Ind., Iowa, Mo., Tex.
Karstenula sp.—Ga.
Mycosphaerella sp., on leaves. Tex.
Phleospora pteleae Tharp, leaf spot. Tex.
Phyllosticta pteleicola Tehon & Daniels, leaf spot. Ill.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia windsoriae Schw. (O,I), rust. N.Y. to Ala., Kans., and Tex. II and III on Poaceae (*Tridens flavus* (L.) Hitch.).
Septoria pteleae Ell. & Ev., leaf spot. Ind., Wis.

Zanthoxylum

(1) *Z. americanum* Mill., common prickly-ash, toothachetree.

Aromatic shrub or small tree. Range 22,23, 24,25,26,27,29,30. Important food for wildlife.

(2) *Z. clava-herculis* L., Hercules-club.

Small tree with very sharp prickles. Range 20,22,25,28,29,30.

(3) *Z. fagara* (L.) Sarg., lime prickly-ash.

Small evergreen tree. Range 11,17,32.

(4) *Z. martinicense* (Lam.) DC.

Small tree of the West Indies.

Aecidium xanthoxyli Pk.: SEE *Puccinia andropogonis* var. *xanthoxyli.*
Catacauma zanthoxyli F.L.Stevens, black patch. C.Z. (4).
Cercospora xanthoxyli Cke., leaf spot. Ind., Tex. (1); Fla., Ga., Tex. (2).
Dermatea xanthoxyli Pk., on dead branches. N.Y. (1).
Diplodia natalensis P.Evans, stem canker. Tex. (1).
Discula xanthoxyli Ell. & Ev., on dead branches. La. (1).

Fomes igniarius (L. ex Fr.) Kickx, white heart rot. (1).
Macrophoma xanthoxyli Ell. & Ev., on branches. La. (1).
Meliola pilocarpi F.L.Stevens, black mildew. C.Z. (4).
Ovulariopsis farinosa Syd., powdery mildew. Fla. (3).
Periconia lateralis Ell. & Ev., on leaves. Tex. (2).
Phoradendron flavescens (Pursh) Nutt., mistletoe. Fla., Tex. (2).
Phyllachora winteri Sacc. & Syd., black patch. P.R. (4).
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Widespread (1).
Puccinia andropogonis Schw. var. *xanthoxyli* (Pk.) Arth. (O,I), rust. Iowa, Kans., Mo., Nebr., Tex., Wis. (1); Fla., Tex. (2). II and III on *Andropogon* spp.
Septoria pachyspora Ell. & Holw., leaf spot. Iowa, Nebr. (1); Tex. (2).
Thyronectria xanthoxyli (Pk.) Ell. & Ev., on stems. Mich., N.Y. (1).

SALICACEAE

Populus,[16] poplar, aspen

I. White Poplars, Aspens

Populus alba L., white poplar; including several varieties, particularly *P. alba* var. *nivea* Ait., silver poplar, and *P. alba* var. *pyramidalis* Bunge (*P. bolleana* Lauche), Bolleana or Turkestan poplar; also *P. canescens* (Ait.) Sm., gray poplar.

Large, much-branched tree of central and southern Europe to western Asia; widely cultivated and naturalized in range 6,8,9,11,22,25, 27,28,29.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, limb gall. Conn., Iowa, Minn., Nebr.
Cercospora populina Ell. & Ev., leaf spot. La.
Cytospora chrysosperma Pers. ex Fr.: SEE *Valsa sordida*.
Didymosphaeria populina Vuill., shoot blight. Maine.
Discella populina Sacc., on twigs. Iowa.
Dothichiza populea Sacc. & Briard, branch and twig canker. Conn., Ind., Iowa, Mass. *P. alba* var. *nivea* and *P. alba* var. *richardii* Henry are reported to be resistant.
Fomes applanatus (Pers. ex Fr.) Gill., root and butt rot. Conn., Utah.
Marssonina castagnei (Desm. & Mont.) Magn., leaf spot. Eastern States to Great Plains. Conidial stage of *Pseudopeziza* (*Drepanopeziza*) *populi-albae* Kleb.
Melampsora albietis-canadensis (Farl.) C.A.Ludwig (II,III), leaf rust. Pa.
M. aecidioides (DC.) Schroet. (II), leaf rust. Colo., R.I., Pacific Coast States.
M. occidentalis Jacks. (II,III), leaf rust. Calif.
Mycosphaerella maculiformis (Pers. ex Fr.) Schroet., on fallen leaves. Ga.
Myxosporium ellisii Sacc., on twigs. Iowa.
Phyllosticta alcides Sacc., leaf spot. Ohio.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. N.Y., Va.
Polyporus hirsutus Wulf. ex Fr., white heart rot. Tenn.
Pseudopeziza (*Drepanopeziza*) *populi-albae* Kleb., on leaves. Conn., Ga., Iowa, Mich., N.Y.
Taphrina johansonii Sadeb., catkin deformity. N.Y.
Valsa nivea Hoffm. ex Fr., branch and twig canker. Widespread.
V. pauperata Cke. & Ell.—Ga.
V. sordida Nits., branch and twig canker. Widespread.

Populus bolleana Lauche: See *P. alba* var. *pyramidalis*, under *P. alba*.
Populus canescens (Ait.) Sm.: See *P. alba*.

[16] Because of the numerous species and varieties, together with natural interspecific hybrids, comprising the genus *Populus*, they are arranged here in groups of botanically and geographically related forms.

Populus grandidentata Michx., large-toothed aspen.

Small to large tree. Range 21,22,23,25,26,27, 28; cultivated in zone 3.

Dicoccum populinum Ell. & Ev.—Iowa.
Didymosphaeria populina Vuill., shoot blight. Wis.
Diplodia populi Fckl., twig blight. Pa.
Fomes applanatus (Pers. ex Fr.) Gill., butt rot, white heart rot. New England to Great Lakes States.
F. igniarius (L. ex Fr.) Kickx, white heart rot. New England to Great Lakes States.
F. pinicola (Sw. ex Fr.) Cke., brown cubical heart rot. N.Y., Vt.
Hypoxylon pruinatum (Klotzsch) Cke., trunk canker. Maine, Mich., Minn., N.Y., Wis.
Macrophoma tumefaciens Shear, bark canker. Minn.
Marssonina castagnei (Desm. & Mont.) Magn., leaf spot. N.Y., Wis.
M. rhabdospora (Ell. & Ev.) Magn., leaf spot. N.J., N.Y., Pa., Wis. (Doubtful if a *Marssonina*).
Melampsora abietis-canadensis (Farl.) C.A.Ludwig (II,III), leaf rust. New England States to Mich. and Wis.
M. medusae Thuem. (II,III), leaf rust. Wis.
Mycosphaerella orbicularis (Pk.) House, on leaves. N.Y.
M. populorum G.E.Thompson (*Septoria musiva* Pk.), leaf spot. Ind., N.Y., Wis.
Nectria galligena Bres., canker, New England States.
Phyllosticta maculans Ell. & Ev., leaf spot. N.Y.
Polyporus spp., especially *P. adustus* Willd. ex Fr. and *P. dryophilus* Berk., heart rot. New England and Great Lakes States.
Stigmina populi (Ell. & Ev.) Pk., leaf spot. Del.
Taphrina johansonii Sadeb., catkin deformity. Mass., N.Y., Wis.
Uncinula salicis DC. ex Wint., powdery mildew. Widespread.
Valsa nivea Hoffm. ex Fr. and *V. sordida* Nits., twig canker, dieback. Occasional.
Venturia tremulae Aderh.—Iowa.

Populus tremuloides Michx., quaking aspen, quiverleaf; including the var. *aurea* (Tidestr.) Daniels, golden aspen, the typical Rocky Mountain form.

Small to large tree occurring throughout the northern half of the United States, especially in the Great Lakes and northern Plains regions.

Ciborinia bifrons (Whet.) Whet. (*Sclerotinia whetzelii* Seaver), ink spot. Mich., Minn., N.Y., Vt., Wis.
C. confundens (Whet.) Whet. (*Sclerotinia bifrons* Seaver & Shope), ink spot. Colo. to Wyo., Oreg., and Wash.; Idaho.
Cladosporium letiferum Pk., leaf blight. N.Y.
C. rambosum Desm.—Ill.
C. subsessile Ell. & Barth., leaf spot. Colo., Utah, Wis.
Coniophora puteana Schum. ex Fr., timber rot. Cosmopolitan.
Cytospora chrysosperma Pers. ex Fr.: SEE *Valsa sordida*.

C. nivea Hoffm. ex Sacc.: See *Valsa nivea.*
Didymosphaeria populina Vuill. (*Napicladium tremulae* (Frank) Sacc.), shoot blight. New England States to Minn., Oreg., Wash.
Dothichiza populea Sacc. & Briard, canker. Wis.
Dothiora polyspora Shear & Davidson, on twigs, ?canker. Colo.
Erysiphe cichoracearum DC., powdery mildew. Utah.
Fomes applanatus (Pers. ex Fr.) Gill., butt rot, heart rot. Widespread.
F. connatus (Weimm. ex Fr.) Gill., white heart rot. New England States.
F. fomentarius (L. ex Fr.) Kickx, heart rot. Occasional.
F. igniarius (L. ex Fr.) Kickx, white heart rot, common after fire injury. General; Wyo.
F. pinicola (Sw. ex Fr.) Cke., brown cubical rot. Occasional.
Fusicladium tremulae Frank (=*F. radiosum* (Lib.) Lind): See *Didymosphaeria populina.*
Hypoxylon pruinatum (Klotzsch) Cke., trunk canker. New England and Great Lakes States; Iowa.
Macrophoma tumefaciens Shear, bark canker. Minn.
Marssonina spp., including *M. brunnea* (Ell. & Ev.) Magn., *M. castagnei* (Desm. & Mont.) Magn., and *M. populi* (Lib.) Magn., leaf spot. Widespread.
Melampsora abietis-canadensis (Farl.) C.A.Ludwig (II,III), leaf rust. New England to Ind.
M. albertensis Arth. (II,III), leaf rust. Mont. to N.Mex., Calif., and Alaska.
M. medusae Thuem. (II,III), leaf rust. Widespread, especially in the Northeast; Wis.
Melanconis occulta (Fckl.) Sacc.—Mich., N.Y.
Mycosphaerella populorum G.E.Thompson (*Septoria musiva* Pk.), leaf spot. N.J., N.Y., Ohio, Wis. Sometimes reported as *S. populi* Desm.
Myrioconium comitatum J.J.Davis, on leaves, associated with *Sclerotium bifrons* Ell. & Ev. (?spermatial stage). Wis. ?A true *Myrioconium.*
Napicladium tremulae (Frank) Sacc.: See *Didymosphaeria populina.*
Nectria galligena Bres., canker. Mich., Minn., N.H., New England States.
Pezicula eximia Rehm, on branches. N.Y.
Phyllosticta maculans Ell. & Ev., leaf spot. N.Y.
Polyporus adustus Willd. ex Fr., white spongy rot. Widespread.
P. dryophilus Berk., white-mottled heart rot. Widespread; Wyo.
Sclerotinia spp.: See *Ciborinia bifrons* and *C. confundens.*
Septogloeum rhopaloideum Dearn. & Bisby, leaf spot. Wyo.
Septoria musiva Pk.: See *Mycosphaerella populorum.*
Stigmina populi (Ell. & Ev.) Pk., leaf spot. Mont., N.Y., S.Dak.
Taphrina johansonii Sadeb., catkin deformity. Iowa, Mass., Mich., N.Y., Wis.
Trametes hispida Bagl., timber rot, sometimes wound or heart rot. Widespread.
Uncinula salicis DC. ex Wint., powdery mildew. Widespread.
Valsa nivea Hoffm. ex Fr. (*Cytospora nivea* Hoffm. ex. Sacc.) and *V. sordida* Nits. (*C. chrysosperma* Pers. ex Fr.), on twigs and branches, sometimes canker. Widespread.

II. Cottonwoods, Black Populars

Populus angulata Ait.: See *P. deltoides.*
Populus arizonica Sarg.: See *P. sargentii.*
Populus berolinensis Dipp.: See *P. nigra.*
Populus canadensis Moench (*P. deltoides* Marsh. × *P. nigra* L.).

Strong, upright tree with more or less ascending branches. A group of natural hybrids has originated and is widely cultivated. One of these, *P. canadensis* var. *eugenei* (Simon-Louis) Schelle, Carolina poplar, is often used in street plantings; the name is sometimes applied to the entire group.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, limb gall.
Botryosphaeria ribis Gross. & Dug., branch canker. Ark.
Dothichiza populea Sacc. & Briard, branch canker. Conn., Ohio.
Fomes applanatus (Pers. ex Fr.) Gill, white-mottled heart rot. N.Y.
Marssonina spp., leaf spot. Iowa, Md.
M. brunnea (Ell. & Ev.) Sacc.—Iowa, N.J.
Mycosphaerella populorum G.E.Thompson, leaf spot. N.Y.
Phyllosticta alcides Sacc., leaf spot. Ala.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Septotinia populiperda Waterman & Cash (*Septotis populiperda* (Moesz & Smarods) Waterman & Cash), leaf blotch. Conn., Maine, Mass., Md., N.Y., Pa., Vt.
Valsa sordida Nits., canker and dieback. Widespread.

Populus deltoides Marsh., cottonwood.

Large, broad-headed tree. Range 15,17,18,19,20,21,22,23,24,25,26,27,28,29,30; also cultivated in zone 2. Two principal varieties, to which a confusing number of names has been applied, are recognized: *P. deltoides* var. *missouriensis* Henry, southern cottonwood, and *P. deltoides* var. *virginiana* (Castiglioni) Sudw. (*P. monilifera* Ait.), eastern cottonwood, whose ranges overlap. Included here also are records for *P. heterophylla* L., swamp cottonwood, and *P. angulata* Ait.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Tex.
Cercospora populina Ell. & Ev., leaf spot. La., Tex.
C. populicola Tharp, leaf spot. Tex.
C. reducta Syd., on leaves. Ala.
Ciborinia confundens (Whet.) Whet. (*Sclerotinia bifrons* Seaver & Shope), ink spot. Colo.
Cryptodiaporthe salicina (Curr.) Wehm., on branches. N.Y.
Cytospora chrysosperma Pers. ex Fr.: See *Valsa sordida.*
Dothichiza populea Sacc. & Briard, branch canker. Widespread.
Fomes applanatus (Pers. ex Fr.) Gill., white butt and heart rot. Widespread; Tex. (on *P. heterophylla*).
F. igniarius (L. ex Fr.) Kickx, white heart rot. Widespread; Tex.
Graphium rubrum Rumbold, pink wood stain. Central and Southern States.
Hypoxylon spp.—Ga.
Marssonina populi (Lib.) Magn., leaf spot. Eastern and Central States.
Melampsora abietis-canadensis (Farl.) C.A.Ludwig (II,III), leaf rust. Ind., N. Dak.
M. medusae Thuem. (II,III), leaf rust. General.
M. occidentalis Jacks. (II,III), leaf rust. Idaho.
Melanconis occulta (Fckl.) Sacc., on branches. Mich.
Mycosphaerella macularis (Fr.) Schroet., on leaves. Kans.
M. populifolia (Cke.) House—S.C.
M. populorum G.E.Thompson (*Septoria musiva* Pk.), leaf spot. Vt. to Ga., Tex., and Wis.
Nectria sp., canker. Minn., N.Dak.
Phoradendron flavescens (Pursh) Nutt. var. *macrophyllum* Engelm., mistletoe. Ariz., N.Mex., Tex.

Phyllosticta intermixta Seaver, leaf spot. Kans., Mo., Nebr., Wis. Associated with *Septoria populi* Desm.
P. maculans Ell. & Ev.—Kans.
Phymatotrichum omnivorum (Shear) Dug., root rot. Okla.; Tex.
Physalospora obtusa (Schw.) Cke., on branches. Ga., Kans.
Pleurotus ostreatus Jacq. ex Fr., sapwood rot. N.Dak., Wyo.
Polyporus spp., especially *P. adustus* Willd. ex Fr., *P. dryophilus* Berk., and *P. hirsutus* Wulf. ex Fr., wound rot, white heart rot. Widespread.
Sclerotinia bifrons Seaver & Shope: SEE *Ciborinia confundens.*
Septoria musiva Pk.: SEE *Mycosphaerella populorum.*
S. populi Desm., leaf spot. Ark.
S. populicola Pk.—Tex.
Steccherinum ochraceum (Fr.) S.F.Gray—Iowa.
Stigmina sp.—Ill.
Taphrina aurea Pers. ex Fr., yellow leaf blister. S.C.
T. johansonii Sadeb., catkin deformity. Vt.
Trametes hispida Bagl., wound rot, heart rot. Occasional; Ala. (on *P. heterophylla*).
Uncinula salicis DC. ex Wint., powdery mildew. Widespread; Iowa, Tex.; (on *P. heterophylla*). Ill., Mo., S.C.
Valsa nivea Hoffm. ex Fr., on twigs and branches, sometimes causing canker and dieback. Widespread.
V. sordida Nits., on twigs and branches, sometimes causing canker and dieback. Widespread; Tex. (on *P. heterophylla*).
Venturia tremulae Aderh.—Iowa.

Populus dilatata Ait.: See *P. nigra* var. *italica*, under *P. nigra.*

Populus fremontii S. Wats.: See *P. sargentii.*

Populus heterophylla L.: See *P. deltoides.*

Populus monilifera Ait.: See *P. deltoides* var. *virginiana*, under *P. deltoides.*

Populus nigra L., black poplars.

Tree of Europe and western Asia, pyramidal in growth habit, cultivated, zone 2. The var. *italica* Muenchh., Lombardy poplar, in zone 2, and the var. *betulifolia* (Pursh) Torr. in zone 4 are the most familiar representatives.

Botryosphaeria ribis Gross. & Dug., on branches, ?canker. Ga.
Cercospora populina Ell. & Ev., leaf spot. Ala., Fla.
Ciborinia bifrons (Whet.) Whet. (*Sclerotinia whetzelii* Seaver), ink spot. Mass.
Didymosphaeria populina Vuill., leaf spot. Ky., Minn. (on var. *italica*).
Discella populina Sacc., on twigs. Iowa.
Dothichiza populea Sacc. & Briard, branch and trunk canker. Eastern and Central States, especially on var. *italica.*
Hypoxylon rubiginosum Pers. ex Fr.—Ga.
Marssonina spp., leaf spot. Ind., N.C.
Melampsora abietis-canadensis (Farl.) C.A.Ludwig (II, III), leaf rust.
M. medusae Thuem. (II,III), leaf rust. Mass., Mo., Pa.
M. occidentalis Jacks. (II,III), leaf rust. Calif.
Melanconium hyalinum Ell., on dead branches. Iowa.
Mycosphaerella maculiformis (Pers. ex Fr.) Schroet., on fallen leaves. Ga.
M. populorum G.E.Thompson, leaf spot. Ga., N.Y.
Pezizella oenotherae (Cke. & Ell.) Sacc., on leaves. Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Polyporus farlowii Lloyd, heart rot. Ariz., N.Mex.
Sclerotinia whetzelii Seaver: SEE *Ciborinia bifrons.*
Taphrina aurea Pers. ex Fr. (=*T. populina* Fr.), yellow leaf blister. Iowa, Wash., W.Va. (on *P. nigra*); Iowa, Oreg., Vt. (on *P. nigra* var. *italica*).
Valsa nivea Hoffm. ex Fr. and *V. sordida* Nits., on twigs and branches, occasionally causing canker. Widespread.
VASCULAR DISEASE—cause unknown; ?bacterial. Md.

Populus occidentalis (Rydb.) Britt.: See *P. sargentii.*

Populus sargentii Dode (*P. occidentalis* (Rydb.) Britt.), Great Plains cottonwood.

Large tree of the western Plains and Rocky Mountains. Disease records for several related species, such as *P. arizonica* Sarg., *P. fremontii* S. Wats., and *P. wislizenii* (S. Wats.) Sarg., extending to the Pacific coast and the Southwest, are included here.

Fomes applanatus (Pers. ex Fr.) Gill., root and butt rot. Rocky Mountain States.
Marssonina populi (Lib.) Magn., leaf spot. Calif.
Melampsora abietis-canadensis (Farl.) C.A.Ludwig (II, III), leaf rust. Iowa to Colo. and Mont.
M. albertensis Arth. (II,III), leaf rust. Colo., Mont.
M. medusae Thuem. (II,III), leaf rust. Iowa and S.Dak. to N.Mex.
M. occidentalis Jacks. (II,III), leaf rust. Calif.
Mycosphaerella populorum G.E.Thompson, leaf spot. Calif., Utah.
Myxosporium alboluteum Dearn. & Barth., on twigs. Kans.
Phoradendron flavescens (Pursh) Nutt. var. *macrophyllum* Engelm., mistletoe. Ariz., N.Mex.
Septotinia populiperda Waterman & Cash (*Septotis populiperda* (Moesz & Smarods) Waterman & Cash), leaf blotch. Md. (on *P. fremontii*).
Taphrina populi-salicis Mix—(On *P. fremontii*).
T. johansonii Sadeb., catkin deformity.
Valsa sordida Nits. (*Cytospora chrysosperma* Pers. ex Fr.), canker, dieback. Widespread.

Populus wislizenii (S. Wats.) Sarg.: See *P. sargentii.*

III. Balsam poplars

Populus acuminata Rydb.: See *P. tacamahaca.*

Populus angustifolia James: See *P. tacamahaca.*

Populus balsamifera Muenchh.: See *P. tacamahaca.*

Populus candicans Ait.: See *P. tacamahaca.*

Populus tacamahaca Mill. (*P. balsamifera* Muenchh.), balsam poplar.

Large tree. Range 12,13,15,18,21,23,24,26,27; cultivated, zone 2. Also included are records for *P. candicans* Ait., balm-of-Gilead poplar, an exotic cultivated in zone 4, and also for several of the western species of the balsam poplar group, such as *P. acuminata* Rydb., *P. angustifolia* James, and *P. trichocarpa* Torr. & Gray, western balsam poplar (black cottonwood), of the Rocky Mountains and Pacific coast.

Ciborinia confundens (Whet.) Whet. (*Sclerotinia bifrons* Seaver & Shope), ink spot. Colo.
Cylindrosporium oculatum Ell. & Ev.—Idaho.
C. saximontanense Solheim, leaf spot. Colo. (on *P. angustifolia*).
Fomes annosus (Fr.) Cke., root and butt rot. Mont.
F. applanatus (Pers. ex Fr.) Gill., butt and heart rot. Widespread.

F. connatus (Weinm. ex Fr.) Gill., butt and heart rot. New England States.
F. igniarius (L. ex Fr.) Kickx, white heart rot. Widespread.
Hypoxylon pruinatum (Klotzsch) Cke., trunk canker. Maine to Pa. and Mich.
H. serpens Pers. ex Fr.—Idaho (on *P. trichocarpa*).
Linospora tetraspora G.E.Thompson, leaf blight. Alaska, Wis.
Marssonina spp., especially *M. brunnea* (Ell. & Ev.) Magn., *M. castagnei* (Desm. & Mont.) Magn., *M. populi* (Lib.) Magn., leaf spot. Widespread.
Melampsora abietis-canadensis (Farl.) C.A.Ludwig (II, III), leaf rust. New England States to Wis.
M. albertensis Arth. (II,III), leaf rust. Mont. to Colo., Calif., and Alaska.
M. medusae Thuem. (II,III), leaf rust. New England States to Iowa and Minn.
M. occidentalis Jacks. (II,III), leaf rust. Wis. to Calif. and Wash.
Mycosphaerella populicola G.E.Thompson, leaf spot. Vt. to Mich.; Idaho, Nebr.; on *P. tacamahaca* and *P. trichocarpa*.
M. populifolia (Cke.) House, on leaves. N.Y.
M. populorum G.E.Thompson, leaf spot. Widespread.
Phoradendron flavescens (Pursh) Nutt. var. *macrophyllum* Engelm., mistletoe. Ariz., N.Mex.
Phyllosticta brunnea (Dearn. & House) Dearn. & Barth., leaf spot. Colo., Wis.
P. intermixta Seaver, on leaves. N.C.
Sclerotinia bifrons Seaver & Shope: See *Ciborinia confundens*.
Septotinia populiperda Waterman & Cash (*Septotis populiperda* (Moesz & Smarods) Waterman & Cash), leaf blotch. Md. (on *P. trichocarpa*).
Taphrina populi-salicis Mix, yellow leaf spot. Calif., Oreg. (on *P. trichocarpa*).
Trametes spp., especially *T. hispida* Bagl. and *T. suaveolens* Fr., wood rot, sometimes on living trees. Widespread.
Uncinula salicis DC. ex Wint., powdery mildew. Widespread.
Valsa nivea Hoffm. ex Fr. and *V. sordida* Nits., twig and branch canker. Widespread.
Xylaria digitata (L. ex Fr.) Grev., root rot. Idaho.

Populus trichocarpa Torr. & Gray: See *P. tacamahaca*.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Tex.
Armillaria mellea Vahl ex Fr., root rot. Occasional, noted especially in the West; Calif.
Botryosphaeria ribis Gross. & Dug. and var. *chromogena* Shear, N. E. Stevens, & M. S. Wilcox, on branches, sometimes causing cankers. Widespread but noted especially in the South.
Cenangium populneum Pers. ex Rehm, on dead branches. Widespread. Appears not to be related to *Dothichiza populea* Sacc. & Briard, as sometimes suggested.
Ciborinia bifrons (Whet.) Whet. (*Sclerotinia whetzelii* Seaver), black leaf spot. New England States to Rocky Mountains.
C. confundens (Whet.) Whet. (*Sclerotinia bifrons* Seaver & Shope), black leaf spot. Occurring on the ground in Colo. Not known to have a pathogenic stage on *Populus*.
Collybia velutipes Fr., wood rot usually of logs and stumps, sometimes on living trees. Northern Rocky Mountain States.
Cryptodiaporthe salicina (Curr.) Wehm., on branches. Mich., N.Y.
Cryptosphaeria populina (Pers. ex Fr.) Sacc., on dead branches. Widespread.
Cylindrosporium oculatum Ell. & Ev.: See *Septoria musiva*.
Cytospora chrysosperma Pers. ex Fr.: See *Valsa sordida*.
C. nivea (Hoffm. ex Fr.) Sacc.: See *Valsa nivea*.
Daedalea confragosa Bolt. ex Fr. and *D. unicolor* Bull. ex Fr., white-mottled heart rot, sometimes on living trees. Occasional.
Didymosphaeria populina Vuill.: See *Venturia populina*.
Dimerosporium populi Ell. & Ev.—N.J.
Dothichiza populea Sacc. & Briard, branch and trunk canker. Widespread.
Favolus alveolaris DC. ex Quél., wound rot, white heart rot. Occasional.
Fomes spp., wood rot, chiefly of trunks and logs. Species reported include: *F. connatus* (Weinm. ex Fr.) Gill—New England States; *F. annosus* (Fr.) Cke., *F. fomentarius* (L. ex Fr.) Kickx, and *F. pinicola* (Sw. ex Fr.) Cke.—North Central and Western States.
F. applanatus (Pers. ex Fr.) Gill., butt rot, white-mottled heart rot. Widespread, especially in the West.
F. igniarius (L. ex Fr.) Kickx, white spongy heart rot. Widespread.
Fusicladium radiosum (Lib.) Lind: See *Venturia populina*.
Gloeosporium populi (Lib.) Mont. & Desm.: See *Marssonina populi*.
G. stenosporum Ell. & Kell.: See *Marssonina stenospora; ?Septoria populi*.
Hericium coralloides Scop. ex S. F. Gray, wood rot, chiefly of logs. Northwestern States.
Hypoxylon howeianum Pk.—N.Y.
H. pruinatum (Klotzsch) Cke., trunk canker. New England and Great Lakes States; Iowa.
H. rubiginosum Pers. ex Fr.
Lenzites saepiaria Wulf. ex Fr. and occasionally *L. betulina* L. ex Fr., *L. trabea* Pers. ex Fr., and *L. vialis* Pk., sapwood rot, sometimes brown heart rot of living trees. Widespread.
Marssonina spp., leaf spot. Widespread. Reported under several imperfectly distinguished specific names; by some regarded as all synonyms of *M. populi* (Lib.) Magn. but by others segregated into at least two species distinguished in their perfect stages, and others in which the perfect stage is unknown: *M. castagnei* (Desm. & Mont.) Magn., conidial stage of *Drepanopeziza* (*Pseudopeziza*) *populi-albae* (Kleb.) Nannf., and *M. populi-nigrae* Kleb., conidial stage of *D. populorum* (Desm.) Hoehn. The former has been collected in the U. S., the latter not certainly. *M. populi* antedates *M. castagnei*. Other species collected here are reported as: *M. brunnea* (Ell. & Ev.) Magn., *M. pyriformis* (Riess) Magn., *M. rhabdospora* (Ell. & Ev.) Magn., *M. stenospora* (Ell. & Kell.) Magn., the latter two species doubtfully of this genus. In this list all are reported as *Marssonina* spp.
Melampsora abietis-canadensis (Farl.) C. A. Ludwig, (II,III), leaf rust. On native and introduced poplars in the New England States to the Great Plains. O and I on *Tsuga canadensis* (L.) Carr.
M. albertensis Arth. (II,III), leaf rust. On native poplars in Mont. to N.Mex., Calif. and Alaska. O and I on *Pseudotsuga taxifolia* (Poir.) Britt.
M. medusae Thuem. (II,III), leaf rust. On native and introduced poplars throughout the United States except in the Far South. O and I on *Larix laricina* (Du Roi) K. Koch.
M. occidentalis Jacks. (II,III), leaf rust. On native poplars, Mont. to Calif. and Wash. O and I unknown; on ?*Larix*.
Melanconis apocrypta Ell. (?*Melanconium populinum* Pk.), on branches. Iowa, ?N.Y.
Mycosphaerella spp., parasitic or occurring on fallen leaves:

Mycosphaerella macularis (Fr.) Schroet.—On *P. deltoides* in Kans.; *P. tremuloides* in N.Y.
M. orbicularis (Pk.) House—On *P. grandidentata* in N.Y.
M. populicola G. E. Thompson (*Septoria populicola* Pk.), leaf spot. Idaho, Mich., Nebr., N.Y., Vt.
M. populifolia (Cke.) House—On *P. deltoides* in S.C.; on *P. tacamahaca* in N.Y.
M. populnea (Sacc.) House=?*M. populicola*, q. v.
M. populorum G. E. Thompson (*Septoria musiva* Pk.), leaf spot, also a twig canker on some species. On various poplars in the eastern U. S. to the Great Plains; also in the West.
Napicladium tremulae (Frank) Sacc.: SEE *Venturia populina.*
Nectria spp., including *N. cinnabarina* Tode ex Fr. and *N. verrucosa* (Schw.) Sacc., on twigs and branches —Occasional; *N. galligena* Bres.—Great Lakes and New England States.
Pholiota adiposa Fr. and *P. destruens* (Fr.) Bres., wound rot, heart rot. Northwestern States to Alaska.
Phyllosticta spp., on leaves, sometimes associated with *Septoria* or *Marssonina.* Species reported include: *P. alcides* Sacc., *P. brunnea* Dearn. & Barth., *P. intermixta* Seaver, and *P. maculans* Ell. & Ev.
Pleurotus ostreatus Jacq. ex Fr. and *P. serotinus* Schrad. ex Fr., sapwood rot or sometimes heart rot of living trees. Widespread.
Polyporus spp., wood rot of logs, stumps, and sometimes living trees, typically causing a white spongy rot. Species reported most commonly include: *P. adustus* Willd. ex Fr., *P. arcularius* Batsch ex Fr., *P. caesius* Schrad. ex Fr., *P. cinnabarinus* Jacq. ex Fr., *P. crispus* Pers. ex Fr., *P. dichrous* Fr., *P. dryophilus* Berk. (*P. rheades* (Pers.) Fr.), *P. elegans* Bull. ex Fr., *P. farlowii* Long, *P. fumosus* Fr., *P. galactinus* Berk., *P. hirsutus* Wulf. ex Fr., *P. picipes* Fr., *P. resinosus* Schrad. ex Fr., *P. squamosus* Huds. ex Fr., *P. subchartaceus* (Murr.) Overh., *P. varius* Pers. ex Fr., *P. versicolor* L. ex Fr., *P. zonatus* Fr. — Widespread, especially on aspen in the West and Northwest.
P. pargamenus Fr.—Wis.
P. spumeus Sow. ex Fr.—Colo.
Poria spp., rot of dead trunks and branches; none reported as causing economic timber rots. Cosmopolitan.
Pratylenchus pratensis (De Man) Filip., in roots. N.Y.
Pseudopeziza populi-albae Kleb.—Iowa.
Schizophyllum commune Fr., wood rot, sometimes wound rot. Cosmopolitan.
Sclerotinia spp.: SEE *Ciborinia bifrons* and *C. confundens.*
Septoria musiva Pk.: SEE *Mycosphaerella populorum.*
S. populi Desm., leaf spot. Reported from various localities but not fully authenticated. Conidial stage of *Mycosphaerella populi* (Auers.) Schroet.
S. populicola Pk.: SEE *Mycosphaerella populicola.*
Steccherinum pulcherrimum (Berk. & Curt.) Banker, trunk rot. Wis.
Stereum spp., especially *S. hirsutum* (Willd. ex Fr.) S. F. Gray, *S. purpureum* (Pers. ex Fr.) Fr., and *S. rufum* Fr., rot of dead trunks and branches. Cosmopolitan.
Taphrina johansonii Sadeb., catkin deformity. Widespread.
T. populina Pers. ex Fr., yellow leaf blister. New England to Great Lakes States, Pacific coast.
Trametes spp., including *T. hispida* Bagl., *T. suaveolens* Fr., and *T. trogia* Berk., wound rot, white heart rot of standing or fallen trunks. Widespread, especially in the West and Northwest.
Trochila populorum Auct. Amer.: SEE *Drepanopeziza populi-albae.*
Uncinula salicis DC. ex Wint., powdery mildew. Widespread.
Valsa ambiens Pers. ex Fr. and occasionally *V. leucostoma* Pers. ex Fr., on dead branches. Widespread.
V. nivea Hoffm. ex Fr., on twigs and branches, sometimes causing canker.
V. sordida Nits., canker on some species, usually following injury. Widespread.
Venturia populina (Vuill.) Tub. (*V. tremulae* Aderh., *Didymosphaeria populina* Vuill.), shoot blight. New England States to Wis. (On other species in this group often reported as *V. tremulae* and *Didymosphaeria populina*).

Salix,[17] willow

S. alba L., white willow.

Large tree of Europe, grown for ornament (var. *tristis* Gaudin) and basketmaking (var. *vitellina* (L.) Stokes), zone 2; naturalized in the Eastern, Central, and Great Plains States.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Conn.
Asteroma capreae Desm., on leaves. Conn.
Botryosphaeria ribis Gross. & Dug., branch canker. Ga., Mo.
Cercospora salicina Ell. & Ev., leaf spot. La.
Cryptodiaporthe salicina (Curr.) Wehm., twig and branch canker. Md., N.Y.
Cytospora spp.: SEE *Valsa* spp.
Discella carbonacea (Fr.) Berk. & Br., twig canker. Conn.
Fomes applanatus (Pers. ex Fr.) Gill., heart rot. Conn.
Fusicladium saliciperdum (Allesch. & Tub.) Tub., scab, blight (?secondary). Conn., Maine, Mass., N.H., N.Y. SEE ALSO under *Salix* spp.
Gloeosporium salicis West., leaf spot. Wis.
Melampsora abieti-capraearum Tub. (II,III), rust. Conn., N.Y., Pa., Wash.
M. bigelowii Thuem. (II,III), rust. Conn., Nebr., Wash., Wis.
Phyllosticta apicalis Davis, leaf spot. Kans.
Physalospora miyabeana Fukushi, black canker, on leaves and twigs. Conn. SEE ALSO under *Salix* spp.
Trametes suaveolens L. ex Fr., wound rot, heart rot. Conn., Maine.
Uncinula salicis DC. ex Wint., powdery mildew. Conn., N.Y.
Valsa sordida Nits. (*Cytospora chrysosperma* Pers. ex Fr.) dieback, canker. N.J., N.Y., Okla., Wis.
V. translucens de N. (*Cytospora translucens* Sacc.), on twigs. N.Y.

Salix amygdaloides Anderss., peachleaf willow.

Small, sometimes large, tree, occurring nearly throughout the northern half of the country except in the coast regions.

Cytospora spp.: SEE *Valsa* spp.
Daedalea confragosa Bolt. ex Fr., heart rot. Ind., Mass.
Melampsora bigelowii Thuem. (II,III), rust. General.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Ind. to Tex.
Rhytisma salicinum Pers. ex Fr., tar spot. S.Dak.
Uncinula salicis DC. ex Wint., powdery mildew. Widespread.
Valsa nivea Hoffm. ex Fr.—Utah.
V. sordida Nits. (*Cytospora chrysosperma* Pers. ex Fr.), twig canker. Colo., S.Dak.

Salix babylonica L., Babylon weeping willow, and *S. blanda* Anderss. (*S. babylonica* × *S.*

[17] Only the more common native species and those of greatest importance in horticulture, forestry, and soil conservation are listed separately here. The species are arranged alphabetically and with some grouping of botanically and geographically related forms.

fragilis), Wisconsin weeping willow, Niobe willow, and others.

Large, ornamental, broad-headed trees with pendulous branches; *babylonica* cultivated in zone 5, *blanda* in zone 4. Other species also include varieties of pendulous habit.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Conn., N.J., Tex.
Botryosphaeria ribis Gross. & Dug., branch canker. Md.
Cercospora salicina Ell. & Ev., leaf spot. Md.
Daedalea confragosa Bolt. ex Fr., heart rot. Pa.
Discella carbonacea (Fr.) Berk. & Br., twig canker. Mass., N.Mex. Conidial stage of *Cryptodiaporthe salicina*.
Fusicladium saliciperdum (Allesch. & Tub.) Tub., blight. Mass. SEE ALSO under *Salix* spp.
Ganoderma lucidum (Leyss. ex Fr.) Karst., wood rot. Md.
Macrophoma sp., branch canker. Tex.
Marssonia sp., twig canker. N.Y.
Melampsora abieti-capraearum Tub. (II,III), rust. Mo., W.Va.
Physalospora miyabeana Fukushi, black canker, on leaves and twigs. W.Va. SEE ALSO under *Salix* spp.
P. obtusa (Schw.) Cke., on branches. Ga.
Valsa salicina Pers. ex Fr. (*Cytospora salicis* (Cda.) Rab.), twig canker. Md.
V. sordida Nits. (*Cytospora chrysosperma* Pers. ex Fr.) —Iowa, Md., N.J., N.Mex., Tenn.

Salix bebbiana Sarg., Bebb willow, and *S. scouleriana* Barratt, mountain willow.

S. bebbiana a small or sometimes large tree occurring from New York to California and Washington, chiefly in the North Central and Rocky Mountain States, cultivated, zone 2; *S. scouleriana* a large shrub or small tree occurring from Montana to California and Alaska.

Cryptodiaporthe salicina (Curr.) Wehm., branch canker. Va.
Cylindrosporium salicinum (Pk.) Dearn., leaf spot. Wis.
Daedalea confragosa Bolt. ex Fr., heart rot. Mont.
Fomes conchatus (Pers. ex Fr.) Karst. and *F. igniarius* (L. ex Fr.) Kickx, heart rot. Mont., Wash.
Marssonina sp., leaf spot. Wash.
Melampsora abieti-capraearum Tub. (II,III), rust. Northern States, Maine to Minn.; Colo. to N.Mex. and Wash.
M. bigelowii Thuem. (II,III), rust. Wyo. to Calif. and Wash. (on *S. scouleriana*).
M. ribesii-purpureae Kleb. (II,III), rust. Nebr. to N.Mex., Wash., and Alaska (on *S. scouleriana*).
Myxofusicoccum salicis Died., on branches. Wash. (on *S. scouleriana*).
Nectria cinnabarina Tode ex Fr., on branches. Wash. (on *S. scouleriana*).
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Wash.
Ramularia rosea (Fckl.) Sacc., leaf spot. Wis.
Rhytisma salicinum Pers. ex Fr., tar spot. Mont. to N.Mex. and Wash.
Septogloeum salicinum (Pk.) Sacc., leaf spot. Wis.
Uncinula salicis DC. ex Wint., powdery mildew. Colo., Mich., Minn., Mont. (on *S. bebbiana*); Mont., Oreg., Wash., Wyo. (on *S. scouleriana*).
Valsa boreella Karst., *V. salicina* Pers. ex Fr., and *V. sordida* Nits., twig canker. Idaho, Mont., Wash.

Salix blanda Anderss.: See *S. babylonica*.
Salix caprea L.: See *S. discolor*.
alix cinerea L.: See *S. discolor*.

Salix cordata Muhl., heartleaf willow; including also records for *S. missouriensis* Bebb and *S. lutea* Nutt., yellow willow.

Shrubs or small trees: *S. cordata* of range 18,21,22,23,24,25,26,27,28, cultivated in zone 3; *S. missouriensis*, occurs from Kentucky to Missouri, Iowa, and Nebraska; and *S. lutea* of the Great Plains and Rocky Mountain States.

Cylindrosporium salicinum (Pk.) Dearn., leaf spot. N.Y.
Discella carbonacea (Fr.) Berk. & Br., twig canker. S.Dak.
Fomes conchatus (Pers. ex Fr.) Gill., heart rot. S.Dak.
Fusicladium saliciperdum (Allesch. & Tub.) Tub., blight. Conn., Mass., N.Y., Pa.
Gloeosporium boreale Ell. & Ev., leaf spot. Vt. *?Cylindrosporium salicinum.*
Marssonina kriegeriana (Bres.) Magn., leaf spot. Wis.
Melampsora abieti-capraearum Tub. (II,III), rust. Maine to W.Va., Kans., and Mont.
M. bigelowii Thuem. (II,III), rust. Reports mostly from Western States (on *S. cordata* and *S. lutea*). It is not included on these hosts by Arthur.
M. ribesii-purpureae Kleb. (II,III), rust. Mont. to Calif. and Oreg. (on *S. lutea*).
Mycosphaerella salicina Ell. & Ev., on twigs. Kans.
Nectria cinnabarina Tode ex Fr., on branches. N.Mex.
Ocellaria ocellata (Pers. ex Fr.) Schroet., on branches. N.Dak.
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Wash.
Rhytisma salicinum Pers. ex Fr., tar spot. Widespread.
Septoria salicis West., leaf spot. Kans.
Sphaeropsis salicis Ell. & Barth., on branches. Kans.
Uncinula salicis DC. ex Wint., powdery mildew. Widespread.
Valsa boreella Karst., twig canker. Kans.
V. salicina Pers. ex Fr.—Mont., S.Dak.

Salix discolor Muhl., pussywillow; the "pussywillows" of florists, *S. caprea* L., goat willow, and *S. cinerea* L., gray willow.

S. discolor a shrub or small tree of range 15,18,21,22,24,25,26,27,28; cultivated in zone 2. The florist "pussywillows" are small trees of Europe, cultivated for ornament, *S. caprea* in zone 4 and *S. cinerea* in zone 2.

Botryosphaeria ribis Gross. & Dug., branch canker. Va. to Ga. and Ark.
Cytospora chrysosperma Pers. ex Fr.: SEE *Valsa sordida.*
Daedalea confragosa Bolt. ex Fr., heart rot. Minn.
Diplodia salicina Lév., twig blight. Tex.
Diplodina sp., twig canker. Mass. ?Conidial stage of *Cryptodiaporthe salicina* (Curr.) Wehm.
Fusicladium saliciperdum (Allesch. & Tub.) Tub., blight. Conn.
Macrophoma sp., on branches, ?canker. Ark., Miss., N.C., S.C.
Marssonina kriegeriana (Bres.) Magn., leaf spot. Wis.
Melampsora abieti-capraearum Tub. (II,III), rust. Maine to Va. and Minn.
M. bigelowii Thuem. (II,III), rust. Maine to Ind. and Minn.
Myrioconium comitatum J. J. Davis var. *salicarium* J. J. Davis, leaf spot. Wis. Spermatial stage of *?Sclerotinia foliicola.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. Md.
Ramularia rosea (Fckl.) Sacc., leaf spot. Wis.
Rhytisma salicinum Pers. ex Fr., tar spot. Mich.
Septogloeum salicinum (Pk.) Sacc., leaf spot. Wis.

Uncinula salicis DC. ex Wint., powdery mildew. Widespread.
Valsa sordida Nits., twig canker, dieback. N.J., N.Y., Ohio, Wis.

Salix exigua Nutt.: See *S. interior.*

S. fragilis L., crack willow.

Large tree of Eurasia, cultivated in zone 2: used for hedges and shade; locally naturalized in the Eastern States.

Cylindrosporium salicinum (Pk.) Dearn., leaf spot. Wis.
Cytospora chrysosperma Pers. ex Fr.: SEE *Valsa sordida.*
Daedalea confragosa Bolt. ex Fr., heart rot. Mass.
Fusicladium saliciperdum (Allesch. & Tub.) Tub., blight. Mass., N.Y.
Gloeosporium salicis West., leaf spot. Wis.
Marssonina sp., leaf spot. Ga., Mass.
Melampsora abieti-capraearum Tub. (II,III), rust. Ill., Iowa, N.Y., Pa.
Septoria didyma Fckl., leaf spot. Wis.
Uncinula salicis DC. ex Wint., powdery mildew. Iowa, Mass., N.Y.
Valsa sordida Nits., on branches, canker. Mass.
V. translucens de N.—S.Dak.

Salix fluviatilis Nutt.: See *S. interior.*

S. interior Rowlee, sandbar willow, *S. exigua* Nutt., and *S. fluviatilis* Nutt.

Shrubs or small trees: *S. interior* forms thickets on river banks and shoals in the Eastern, Southern, and especially the Central States; *S. exigua,* of the Western States; *S. fluviatilis,* of the Pacific Coast States.

Cercospora salicina Ell. & Ev., leaf spot. La.
Coryneum salicinum (Cda.) Sacc., on branches. N.Dak.
Cryptodiaporthe salicina (Curr.) Wehm., branch canker. Miss., S.Dak.
Cytospora spp.: SEE *Valsa* spp.
Daedalea confragosa Bolt. ex Fr., heart rot. Mo., S.Dak.
Discula brenckleana (Sacc. & Syd.) Petr. (*Macrophoma salicis* Dearn. & Barth.), on branches. Mont., N.Dak., and S.Dak.
Fomes conchatus (Pers. ex Fr.) Gill., heart rot. N.Dak.
Gibberella acervalis (Moug.) Sacc., on dead stems. Idaho.
Gloeosporium salicis West., leaf spot. N.Y., Wis.
Hypoxylon morsei Berk. & Curt., branch canker. Iowa.
Macrophoma brenckleana Sacc. & Syd. and *M. salicis* Dearn. & Barth.: SEE *Discula brenckleana.*
Marssonina kriegeriana (Bres.) Magn., leaf spot. Wis., Wyo.
Melampsora abieti-capraearum Tub. (II,III), rust. Md. to Miss., Tex. and Wash.
M. bigelowii Thuem., rust. On *S. exigua* and *S. fluviatilis* in Mont. to N.Mex. and Wash.
Myrioconium comitatum J.J.Davis var. *salicarium* J.J. Davis, leaf spot. Wis.
Nectria cinnabarina Tode ex Fr., on branches. N.Mex.
Rhytisma salicinum Pers. ex Fr., tar spot. Colo., Mont., N.Dak., S.Dak., Wyo.
Sphaerulina salicina Syd. (?*Griphosphaeria corticola* (Fckl.) Hoehn.), on branches. N.Dak.
Uncinula salicis DC. ex Wint., powdery mildew. Iowa, Mich., Mont., Nebr.
Valsa spp., twig canker, dieback. Species reported include: *V. boreella* Karst. and *V. nivea* Hoffm. ex Fr.—Kans.; *V. salicina* Pers. ex Fr. and *V. sordida* Nits.—N.Dak.; *V. translucens* de N.—Idaho, N.Dak.

Salix laevigata Bebb, red willow, and *S. lasiandra* Benth., Pacific willow.

Small to large trees of the Far Western States, corresponding to the black willow (*S. nigra* L.) of the East.

Ascochyta salicis Bonar, leaf spot. Calif. (on *S. laevigata*).
Fomes igniarius (L. ex Fr.) Kickx, heart rot. Wash.
Marssonina sp., twig blight. Oreg.
M. apicalis (Ell. & Ev.) Magn., leaf spot. Calif.
Melampsora bigelowii Thuem. (II,III), rust. Mont. to N.Mex., Calif., and Wash.
M. ribesii-purpureae Kleb. (II,III), rust. Nev.
Rhytisma salicinum Pers. ex Fr., tar spot. Wash.
Septogloeum salicis-fendlerianae Dearn. & Barth., leaf spot. Idaho, Mont., Wyo.
Sphaceloma murrayae Jenkins & Grodsinsky, gray scab. Oreg., Wash.
Taphrina populi-salicis Mix, yellow leaf blister. Calif.
Uncinula salicis DC. ex Wint., powdery mildew. Calif.
Valsa sordida Nits., canker, dieback. Idaho.

Salix lasiolepis Benth., arroyo willow.

Small to large tree occurring in the Pacific Coast and Southwestern States.

Cryptosporium sp., branch canker. Calif.
Dothiorella gregaria Sacc. (=*Botryosphaeria ribis* Gross. & Dug.), black canker. Calif.
Marssonina apicalis (Ell. & Ev.) Magn. and *M. nigricans* (Ell. & Ev.) Magn., leaf spot. Calif.
Melampsora bigelowii Thuem. (II,III), rust. Calif.
M. ribesii-purpureae Kleb. (II,III), rust. Ariz., Calif., Oreg., Wash.
Septogloeum maculans Harkn., leaf spot. Calif.
Septoria rhabdocarpa Ell. & Barth., on leaves. Calif.
Sphaceloma murrayae Jenkins & Grodsinsky, gray scab. Calif.
Uncinula salicis DC. ex Wint., powdery mildew. Calif.
Valsa sordida Nits., canker. Calif.

Salix lucida Muhl., shining willow, and *S. pentandra* L., bay willow or laurel-leaved willow.

S. lucida, a small, handsome tree of Eastern and North Central States, cultivated, zone 2. *S. pentandra,* an attractive large tree of Eurasia, naturalized in the Eastern States, cultivated in zone 4; planted as a windbreak.

Cylindrosporium salicinum (Pk.) Dearn., leaf spot. Mass. to Mich. and Iowa.
Fusicladium saliciperdum (Allesch. & Tub.) Tub., blight. Conn., Maine.
Gloeosporium salicis West., leaf spot. Ill., Wis.
Lophodermium versicolor (Wahl. ex Fr.) Rehm, on leaves. Pa.
Marssonina apicalis (Ell. & Ev.) Magn., leaf spot. Wis.
Melampsora abieti-capraearum Tub. (II,III), rust. Maine to Iowa and Wis. (on *S. lucida*).
M. bigelowii Thuem. (II,III), rust. N.Y., Pa. (on *S. pentandra*).
Phyllosticta apicalis J.J.Davis, leaf spot. Wis.
Ramularia lucidae J.J.Davis, leaf spot. Wis.
Rhytisma salicinum Pers. ex Fr., tar spot. Iowa, Maine, Mich., N.Y.

Salix lutea Nutt.: See *S. cordata.*

Salix missouriensis Bebb.: See *S. cordata.*

Salix nigra L., black willow.

Large, graceful tree, commonly found along streams in the Eastern, Central, and Southern States to the Great Plains.

Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Conn., Tex.

Botryosphaeria ribis Gross. & Dug., branch canker. Ga., W.Va.
Cercospora salicina Ell. & Ev., leaf spot. La., Tex.
Cryptodiaporthe salicina (Curr.) Wehm., branch canker. Ga.
Cuscuta gronovii Willd., dodder. N.Y.
Cytospora spp.: See *Valsa* spp.
Daedalea ambigua Berk., wood rot. Ga.
D. confragosa Bolt. ex Fr., wood rot, often of living trees. Widespread.
Dendrophoma caespitosa Sacc., on ?twigs. Wash.
Diplodia salicina Lév. (?*D. sarmentorum* Fr.), on dead branches. W.Va.
Fomes spp., heart rot. Occasional. species reported include: *F. applanatus* (Pers. ex Fr.) Gill., *F. connatus* (Weinm. ex Fr.) Gill., and *F. igniarius* (L. ex Fr.) Kickx.
Fusicladium saliciperdum (Allesch. & Tub.) Tub., blight. Conn., Mass., N.Y.
Gloeodes pomigena (Schw.) Colby, on branches. Ind.
Helicobasidium purpureum (Tul.) Pat., root rot. Tex.
Hypoxylon rubiginosum Pers. ex Fr.—Ala.
Marssonina salicina Tehon, leaf spot. Ill.
Melampsora abieti-capraearum Tub. (II,III), rust. General.
M. bigelowii Thuem. (II,III), rust. Reports numerous throughout the range, but *S. nigra* is not listed as a host by Arthur in "North American Flora."
Melanconium sp., twig canker. Colo.
M. salicinum Ell. & Ev., on twigs. La.
Phoma sp. and *P. platysperma* Pk., on twigs. Ill., W.Va.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Ind., Tex.
P. flavescens var. *macrophyllum* Engelm.—Ariz., N.Mex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pleospora ?eustigiae (Cke.) Sacc., on twigs. Wash.
Pleurotus ulmarius Fr., wound rot. N.C.
Polyporus spp., wood rot, sometimes of living trees. Species reported include: *P. crocatus* (Fr.) Lév.—La.; *P. hirsutus* Wulf. ex Fr.—N.C.; *P. squamosus* Huds. ex Fr.—Mass.; *P. unitus* Pers.—Mich., N.Y.; *P. versicolor* L. ex Fr.—La.
Poria ambigua Bres., wood rot. Md., Tex.
P. andersonii (Ell. & Ev.) Neuman—Md.
Rhytisma salicinum Pers. ex Fr., tar spot. Miss., Tex.
Trametes hispida Bagl., trunk rot. Ark., La.
Uncinula salicis DC. ex Wint., powdery mildew. Widespread.
Valsa salicina Pers. ex Fr. (*Cytospora salicis* (Cda.) Rab.), twig and branch canker. Ala., Nebr., W.Va.
V. sordida Nits. (*Cytospora chrysosperma* Pers. ex Fr.)—Nev.
V. translucens de N.—Ind.

Salix pentandra L.: See *S. lucida.*
Salix purpurea L.: See *S. viminalis.*
Salix scouleriana Barratt: See *S. bebbiana.*
Salix sericea Marsh., silky willow.
Handsome shrub or small tree. Range 21 to 27; cultivated in zone 3.

Cryptomyces maximus (Fr.) Rehm, blister canker.
Fusicladium saliciperdum (Allesch. & Tub.) Tub., shoot blight. Conn., N.Y.
Melampsora abieti-capraearum Tub. (II,III), leaf rust. Conn., Ind., N.Y., Va.
Septogloeum salicinum (Pk.) Sacc., leaf spot. N.Y.
Septomyxa grisea Dearn. & House, on twigs. N.Y.
Uncinula salicis DC. ex Wint., powdery mildew. Ind.

Salix viminalis L., common osier, basketwillow, and *S. purpurea* L., purple osier.
Shrubs or small trees of Europe and Asia, grown for basketmaking and for ornament, cultivated in zones 3 and 4, respectively, and naturalized in the Eastern States.

Cryptomyces maximus (Fr.) Rehm, blister canker.
Cryptosphaeria populina Pers. ex Sacc., on dead branches. Pa.
Cytospora salicis (Cda.) Rab.: See *Valsa salicina.*
Melampsora abieti-capraearum Tub. (II,III), leaf rust. N.Y., Pa.
Nectria cinnabarina Tode ex Fr., on twigs. Alaska.
Valsa salicina Pers. ex Fr., twig and branch canker. Calif., Iowa.

Salix spp. (various, undetermined, or unspecified species).

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Widespread.
Aleurodiscus spp., on bark, usually of dead or sometimes living branches. Species reported include: *A. macrodens* Coker and *A. oakesii* (Berk. & Curt.) Cke.—Eastern States; *A. griseo-canus* (Bres.) Hoehn. & Litsch.—Iowa, Mo.
Armillaria mellea Vahl ex Fr., root rot. Calif., Wash.
Asteroma capreae Desm., on leaves. Conn.
Botryosphaeria ribis Gross. & Dug., including var. *chromogena* Shear, N.E. Stevens, & M.S. Wilcox, branch and trunk canker. Md. to Fla. and Ark., W.Va. Conidial stage=*Dothiorella ribis* (Fckl.) Sacc.
Capnodium salicinum Mont., sooty mold. Calif., Wis.
Cenangium populneum Pers. ex Rehm, on dead branches. Colo.
Cercospora salicina Ell. & Ev., leaf spot. Ill., La., Md., Tex.
Chlorosplenium aeruginosum (Oed.) de N., green wood stain. Widespread.
Ciboria acerina Whet. & Buchw., on staminate catkins. N.Y.
C. caucus (Reb. ex Pers.) Fckl.—N.Y., Oreg.
Coccomyces salicinus (Ell. & Ev.) Sacc., on dead branches. Mont.
Collybia velutipes Fr., commonly on stumps and logs, sometimes in wounds of living trunks. N.Dak., N.Y.
Coniothyrium sp., on twigs. Conn.
C. fuligineum (Karst.) Sacc.—Alaska.
C. spokanense Sacc.—Wash.
Corticium bombycinum (Sommerf.) Bres., on bark, sometimes of living trunks. New England States, Tex., Wash. Other species frequent on dead wood.
Coryneum salicinum (Cda.) Sacc., on twigs. N.Dak.
C. pezizoides Ell. & Ev.—Colo., Idaho.
Cryptodiaporthe salicina (Curr.) Wehm. (*Discella carbonacea* (Fr.) Berk. & Br.), branch and twig canker. Maine to Va., Okla., Kans., and S.Dak.; Calif., Wash., Alaska.
Cryptomyces maximus (Fr.) Rehm, bark blister. N. Mex., Utah.
Cryptosporiopsis scutellata (Otth) Petr.: See *Ocellaria ocellata.*
Cuscuta spp., dodder. Utah.
C. compacta Juss.—Fla. (on *S. longipes* Shuttlew).
C. gronovii Willd.—N.Y.
C. megalocarpa Rydb.—Wash.
C. polygonorum Engelm.—Iowa.
Cylindrocarpon magnusianum (Sacc.) Wr.: See *Neonectria ramulariae.*
Cylindrosporium salicinum (Pk.) Dearn., leaf spot. Mass. to Colo. and Wis.; Miss.
Cytidia flocculenta (Fr.) Hoehn. & Litsch., on trunks and branches, at times on living trees. Alaska, Mont., Wyo.
C. salicina (Fr.) Burt, on dead branches. Widespread.
Cytospora spp.: See *Valsa* spp.
Daedalea ambigua Berk., wood rot. N.C., Va.
D. confragosa Bolt. ex Fr., white spongy heart rot, often on living trees. Widespread.

Daedalea unicolor Bull. ex Fr.—New England States to Va. Kans., and S.Dak.

Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., wood rot. Widespread.

D. grandis Child and *D. occidentalis* Child—Western States.

Diaporthe tessella (Pers. ex Fr.) Rehm, on branches, ?canker. Iowa, La., N.Y.

Diplodia sp., ?twig blight. Calif., Tex., W.Va. Reported as *D. salicina* Lév. in Tex. and W.Va. (=*D. sarmentorum* Fr.) but doubtful.

Diplodina spp., twig blight. Mass., Md., W.Va. Reported as *D. salicis* West. or *D. salicicola* (Johnson) Sacc. & Trav. but probably immature stages of the following, q. v.

Discella carbonacea (Fr.) Berk. & Br., twig blight, canker. New England States. Conidial stage of *Cryptodiaporthe salicina*, q. v.

Discula microsperma (Berk. & Br.) Sacc. (*Discella microsperma* Berk. & Br.), on twigs. Calif.

Dothiora polyspora Shear & Davidson, twig canker and dieback. Colo.

Dothiorella sp., branch canker. Ark., N.Dak.

D. pyrenophora (Karst.) Sacc. var. *salicis* Karst., on twigs. Alaska.

D. ribis (Fckl.) Sacc.: SEE *Botryosphaeria ribis*.

Fomes spp., wood rot, commonly of dead trunks and logs, heart rot and sometimes sapwood rot of living trees. Species reported include: *F. applanatus* (Pers. ex Fr.) Gill.—Conn., N.Y., Wis.; *F. conchatus* (Pers. ex Fr.) Gill.—Mont., N.Y., N.Dak., S.Dak.; *F. connatus* (Weinm. ex Fr.) Gill.—N.Y.; *F. fomentarius* (L. ex Fr.) Kickx—Ala.; *F. fraxinophilus* Pk.—N.Y.; *F. igniarius* (L. ex Fr.) Kickx and var. *nigricans* Fr., white spongy heart rot—Idaho, Ind., N.Y., Wash., Wyo., and Alaska.

Fusicladium saliciperdum (Allesch. & Tub.) Tub., scab, twig blight. New England to N.J. and Pa.; N.C. Conidial stage of *Venturia chlorospora*, q. v. Proved to be secondary as a cause of twig and shoot blight in some cases; perhaps mostly so. SEE ALSO *Physalospora miyabeana*.

Ganoderma lucidum (Leyss. ex Fr.) Karst., wood rot. Va.

G. polychromum (Copeland) Murr.—Calif.

Gloeodes pomigena (Schw.) Colby, on twigs. Ind.

Gloeosporium spp., leaf spot, twig blight. Conn., Del., Mass. Probably in part the conidial stage of *Physalospora miyabeana*, q. v.

G. boreale Ell. & Ev., leaf spot. Vt., Wyo.

G. salicis West. (*Gloeosporidiella salicis* (West.) Nannf.), leaf spot, twig blight. Vt. to N.J., Miss., and Wis.; Oreg. Conidial stage of *Pseudopeziza salicis*, q. v.

G. weirianum Sacc. (*Calogloeum weirianum* (Sacc.) Syd.), on catkins. Colo., Mont.

Helicobasidium purpureum Pat. (*Rhizoctonia crocorum* (Pers.) DC., root rot. Tex.

Hendersonia lineolans (Schw.) Starb., on branches. Pa.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Hydnum ochraceum Pers. ex Fr., on dead wood. Widespread.

Hypoxylon spp., on dead wood. Many species reported, frequently *H. blakei* Berk. & Curt., *H. morsei* Berk. & Curt., and *H. rubiginosum* Pers. ex Fr.—Widespread.

Lenzites betulina L. ex Fr., *L. saepiaria* Wulf. ex Fr., and *L. trabea* Pers. ex Fr., brown cubical rot of trunks and logs. Widespread.

Lophium dolabriforme Wallr., on dead twigs. Colo.

Lophodermium versicolor (Wahl. ex Fr.) Rehm, on leaves. Colo., Pa., Alaska.

Macrophoma sp. (?*Phomopsis salicina* (West.) Died.), canker, twig blight. Ark., Ky., Miss., N.C., S.C., Tex.

M. salicis Dearn. & Barth. (=*Discula brenckleana* (Sacc. &. Syd.) Petr.), on twigs. Mont.

Marssonina spp., leaf spot, rarely on twigs. Widespread. Most reports are without specific identification and several species have been described but are not clearly distinguished. Those reported in the U.S. and their distribution are: *M. apicalis* (Ell. & Ev.) Magn.—Calif., Wis., Wyo.; *M. kriegeriana* (Bres.) Magn.—Calif., Wis., Wyo.; *M. nigricans* (Ell. & Ev.) Magn.—Calif.; *?M. populi* (Lib.) Magn.—Del., Mass., Okla., Wis.; *M. rubiginosa* (Ell. & Ev.) Magn.—Idaho, Wis.; *M. salicicola* (Bres.) P. Magn. (conidial stage of *Drepanopeziza sphaeroides* (Fr.) Nannf.)—Md., N.Y.; *M. salicina* Tehon—Ill.; *M. salicis* (Trail) Magn.—Mass.

Melampsora abieti-capraearum Tub. (*M. americana* Arth.) (II,III), leaf rust. Throughout the U.S. except the Far North. O and I on *Abies* spp., but persists in the uredinial stage.

M. arctica Rostr. (II,III), leaf rust. Alaska, Colo., N.H. Formerly reported from Wis. to Wash., owing to confusion with the preceding. O and I on Saxifragaceae but persists in the uredinial stage.

M. bigelowii Thuem. (II,III), rust. Maine to Alaska, south to N.C., Iowa, and N.Mex. O and I on *Larix* spp.; but persists in the uredinial stage and as mycelium in stems.

M. ribesii-purpureae Kleb. (*M. confluens* (Pers.) Jacks.) (II,III), rust. Mont. to Colo., Calif., and Alaska. O and I on *Ribes* spp.

Meloidogyne sp., root knot nematodes. Miss.

Microthyriella rubi Petr., on twigs. Ind.

Mycosphaerella salicina Ell. & Ev., on twigs. Kans. Causes a dieback in Europe.

Myxofusicoccum salicis Died., on branches. ?Ky., Wash.

Myxosporium cytosporeum Sacc., on branches. Wash.

M. salicinum Sacc. & Roum.—Mass.

M. scutellatum (Otth) Hoehn.: SEE *Ocellaria ocellata*.

Nectria cinnabarina Tode ex Fr., on twigs, associated with dieback. Widespread.

N. coccinea Pers. ex Fr., *N. coryli* Fckl., and *N. galligena* Bres., canker. Oreg.

Neonectria ramulariae Wr. (*Cylindrocarpon magnusianum* (Sacc.) Wr.)—[N. America].

Nummularia clypeus (Schw.) Cke., on branches. Md.

Ocellaria ocellata (Pers. ex Fr.) Schroet. (*Cryptosporiopsis scutellata* (Otth) Petr., *Myxosporium scutellatum* (Otth) Hoehn.), branch canker. Colo., N.C., N.Dak., Pa.

Pezizella oenotherae (Cke. & Ell.) Sacc., on leaves. Va.

Pholiota spp., on stumps and logs, sometimes sapwood rot of living trees. Species reported include: *P. adiposa* Fr. and *P. spectabilis* Fr. — Northern States; *P. aurivelloides* Overh.—Colo., N.Mex., Wyo.; *P. oregonense* Murr.—Oreg.

Phoma sp., twig blight. Ark., N.C.

P. platysperma Pk.—Ill. SEE ALSO *Sclerophoma*.

Phomopsis salicina (West.) Died., twig canker. Iowa, Mass., Va.

Phoradendron flavescens (Pursh) Nutt., mistletoe. Calif., Ind., Tex.

P. longispicum Trel.—Ariz., Calif.

P. macrophyllum (Engelm.) Cockerell—Ariz., N.Mex.

Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Wash.

Phyllosticta apicalis J.J.Davis, leaf spot. Kans., Wis.

P. salicicola Thuem.—Conn., Idaho.

P. salicis Kell. & Swingle—Kans.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Physalospora fusca N.E. Stevens, on branches. Oreg., S.C.

P. gregaria Sacc., twig canker. W.Va.

P. obtusa (Schw.) Cke., on branches. Va. to Fla. and Tenn.

P. miyabeana Fukushi, black canker, ?blight. Maine to W.Va., N.Y. Apparently the primary cause of willow blight within its range; with *Fusicladium saliciperdum*, q.v., secondary.

P. rhodina (Berk. & Curt.) Cke., on dead branches. S.C.

Pleurotus spp., commonly on logs and dead trunks, sometimes sapwood rot of living trees. Species reported include: *P. ostreatus* Jacq. ex Fr.—Calif., Idaho; *P. salignis* Schrad. ex Fr.—Mich.; *P. serotinus* Schrad. ex Fr.—Mich.; *P. ulmarius* Bull. ex Fr.—N.C.

Polyporus spp., wood rot, chiefly of dead trunks and logs; a few may occur on living trees. Species reported include:
P. admirabilis Pk.—N.Y.;
P. adustus Willd. ex Fr.—La., N.C., Wis.;
P. caesius Schrad. ex Fr.—Mont.;
P. cinnabarinus Jacq. ex Fr.—N.Y., Wash.;
P. dichrous Fr.—N.Y.;
P. dryophilus Berk.—Ohio;
P. elegans Bull. ex Fr.—Alaska, Idaho, Wash.;
P. farlowii Long, heart rot. Tex. to Calif.;
P. fumidiceps Atk.—Mo.;
P. fumosus Pers. ex Fr.—Calif.;
P. galactinus Berk.—N.Y.;
P. gilvus (Schw.) Fr.—Nebr.;
P. hirsutus Wulf. ex Fr. and *P. pargamenus* Fr.—Widespread;
P. planellus (Murr.) Overh.—Colo.;
P. pubescens Schum. ex. Fr.—N.Y., Northwestern States;
P. sanguineus L. ex Fr.—Mo.;
P. squamosus Huds. ex Fr.—New England States;
P. sulphureus Bull. ex Fr.—Widespread;
P. tulipiferus (Schw.) Overh.—New England States;
P. unitus Pers.—Widespread;
P. varius Fr.—Wyo.:
P. versicolor L. ex Fr.—Widespread.

Poria spp., wood rot of logs and slash. Species frequently reported are: *P. ambigua* Bres.—Tex.; *P. andersonii* (Ell. & Ev.) Neuman—Md.; *P. ferruginosa* (Schrad. ex Fr.) Cke.—Alaska; *P. punctata* Fr.—Mich., Minn.; *P. reticulata* Pers. ex Fr.—Alaska; *P. viticola* (Schw.) Cke.—N.C., Pa.

Pseudopeziza salicis (Tul.) Poteb. (*Gloeosporium salicis* West.), leaf spot. Minn. This is *Drepanopeziza salicis* (Tul.) Hoehn. in Nannfeldt's terminology.

Ramularia rosea (Fckl.) Sacc., leaf spot. Colo., Mont., Wis.

Rhytisma salicinum Pers. ex Fr.. tar spot. General.

Schizophyllum commune Fr., wood rot, usually on dead branches and trunks. Cosmopolitan.

Scleroderris fuliginosa (Pers. ex Fr.) Karst., on branches, ?canker. N.Y.

Sclerophoma salicis Died. (*?Cytospora salicis* (Cda.) Rab.), twig blight. Calif.

Sclerotinia foliicola Cash & Davidson, on fallen leaves. Colo.

Septogloeum maculans Harkn., leaf spot. Calif., ?Mont.

S. salicinum (Pk.) Sacc., leaf spot. N.Y., Wis., Alaska. *S. saliciperdum* Allesch. & Tub.: See *Fusicladium saliciperdum*.

S. salicis-fendlerianae Dearn. & Barth., leaf spot. Idaho.

Septoria spp., leaf spot. Most of the species reported on willow in the U.S. have been transferred to other genera (see *Cylindrosporium, Marssonina,* and *Septogloeum*); some are European species not known certainly to occur here, thus: *S. albaniensis* Thuem. and *S. salicina* Pk. =*Cylindrosporium salicinum* (Pk.) Dearn.; *S. salicis* West. as reported here =*Septogloeum salicis-fendlerianae* Dearn. & Barth.; *S. saliciola* (Fr.) Sacc. has been collected in Alaska and Oreg.; *S. didyma* Fckl. is reported from Wis., but confirmation is lacking.

Solenia ochracea Hoffm. ex Fr., on bark, sometimes of living trees. Northern States.

Sphaeropsis salicis Ell. & Barth., on dead twigs. Kans., Pa., Tex.

S. salicicola Pass.—Md.

Sphaerulina salicina Syd., on branches. N.Dak.

Stereum spp., wood rot of dead trunks and branches. Species frequently reported include: *S. hirsutum* (Willd. ex Fr.) S.F.Gray—Western States; *S. purpureum* Pers.—Wash.; *S. rameale* Schw.—Widespread; *S. rufum* Fr.—Colo., Idaho; *S. rugosum* Pers. ex Fr.—Minn.

Trametes spp., wood rot, chiefly of dead trunks and logs. Species reported include: *T. hispida* Bagl.—Widespread; *T. malicola* Berk. & Curt.—Wis.; *T. mollis* (Sommerf.) Fr.—Maine; *T. rigida* Berk. & Mont.—La.; *T. sepium* Berk.—N.Y.; *T. trogii* Berk.—Mich.

T. suaveolens L. ex Fr., wound rot, white spongy heart rot. New England States to Mont. and Alaska.

Trimmatostroma americana Thuem., on dead twigs. Widespread.

Uncinula salicis DC. ex Wint., powdery mildew. General.

Valsa spp., twig blight, canker; probably mostly secondary. Species frequently reported: *V. ambiens* Pers. ex Fr.—Widespread; *V. boreella* Karst.—Idaho, Kans., Mich.; *V. nivea* Hoffm. ex Fr.—Western States; *V. salicina* Pers. ex Fr.—Widespread; *V. sordida* Nits. (*Cytospora chrysosperma* Pers. ex Fr.)—Widespread.

Venturia chlorospora (Ces.) Karst. (*Fusicladium saliciperdum* (Allesch. & Tub.) Tub.), on leaves. Colo., possibly Alaska; elsewhere in U.S. known only in artificial cultures. Occurs in Greenland also. Perfect stage of *Fusicladium saliciperdum*, q.v.

V. subcutanea Dearn., on leaves. Alaska.

Galls—mostly caused by insects and related pests, as cone gall caused by the gall midge *Rhabdophaga strobiloides* (O.S.), stem gall by *R. salicis* (Schrank), and warty leaf gall by the mite *Eriophyes aenigma* Walsh. Aerial galls caused by *Agrobacterium tumefaciens*, q. v.

Tracheobacteriosis—cause unknown but believed bacterial. Md., Pa., Va.

SANTALACEAE

Buckleya

B. distichophylla (Nutt.) Torr., buckleya.

Upright shrub, parasitic on the roots of *Tsuga;* distributed in North Carolina and Tennessee, occasionally cultivated.

Cronartium comandrae Pk. (II,III), rust. Tenn. O and I on *Pinus* spp.

Comandra, bastard-toadflax

(1) *C. umbellata* (L.) Nutt.

(2) Other species.

Perennial herbs, usually in dry fields and thickets throughout the Northern States to Georgia, Texas, and California; parasitic on roots of other plants; of use to wildlife.

Cronartium comandrae Pk. (II,III), rust. General. O and I on *Pinus* spp.

Puccinia andropogonis Schw. var. *pustulata* (Curt.) Arth. (O,I), rust. Mass. to Kans. and Wis. (1); Iowa to Colo. and N. Dak. (2). II and III on *Andropogon* spp.

SAPINDACEAE

Cupania

Cupania spp.

Trees and shrubs of tropical America; flowers very fragrant.

Cephaleuros virescens Kunze, algal spot. P.R.
Irenopsis cupaniae F.L.Stevens, black mildew. P.R.
Meliola praetervisa Gaill. and *M. thouiniae* Earle, black mildew. P.R.

Dodonaea

Dodonaea spp.

Shrubs or small trees, sometimes planted in southern Florida and southern California for ornament; *D. viscosa* Jacq. (*D. arizonica* A. Nels.) grown in Florida, Hawaii, and the West Indies.

Campanella cucullata (Jungh.) Lloyd—T.H.
Meliola lyoni F.L.Stevens, black mildew. T.H.

Exothea

E. paniculata (Juss.) Radlk., butterbough.

Small tree of southern Florida.

Fomes extensus Lév., butt rot, heart rot. Fla.

Koelreuteria

Koelreuteria spp., especially *K. bipinnata* Franch. and *K. paniculata* Laxm., golden-rain-tree.

Deciduous trees of China and Japan, cultivated for ornament; *K. bipinnata* in zone 7, *K. paniculata* in zone 5.

Cercospora sp., leaf spot. Fla.
Diplodia koelreuteriae Sacc., on branches. N.J.
Nectria cinnabarina Tode ex Fr., canker. Calif., Conn.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. Md.
Verticillium sp., wilt. N.J.

Litchi

L. chinensis Sonner. (*Nephelium litchi* Cambess), litchi.

Tree of China, grown for edible fruits in the Hawaiian Islands and southern Florida and California; the dried fruit known as "litchi nuts."

Clitocybe tabescens (Scop. ex. Fr.) Bres., root rot. Fla.
Gloeosporium sp., leaf blight. Fla., T.H.

Melicocca

M. bijuga L., mamoncillo, Spanish-lime.

Slow-growing tree of tropical America, grown for its edible fruit and for ornament.

Meliola sapindacearum Speg., black mildew. C.Z., P.R.

Paullinia

Paullinia spp.

Climbing shrubs of tropical America, grown for ornament; an upright fernlike pot plant.

Meliola paulliniae F.L.Stevens, black mildew. C.Z., P.R.
M. sapindacearum Speg.—P.R.
Meliolina paulliniae F.L.Stevens, on leaves. P.R.
Puccinia arechavaletae Speg. (III), rust. P.R.

Sapindus, soapberry

(1) *S. drummondii* Hook. & Arn., western soapberry, wild China tree, and *S. marginatus* Willd., Florida soapberry.

Deciduous shrubs or small trees; *S. drummondii* of range 11,16,17,19,20,22,25,29,30; both species grown for ornament in zone 5.

(2) *S. saponaria* L., southern soapberry; and *S. mukorosii* Gaertn. var. *carinatus* Radlk., Chinese soapberry.

S. saponaria an evergreen tree of tropical America, grown for ornament and the production of saponin in the fruits; *S. mukorosii* var. *carinatus*, of southeastern Asia, cultivated in zone 7.

Cylindrosporium griseum Heald & Wolf, leaf blight. Okla., Tex. (1).
Glomerella cingulata (Ston.) Spauld. & Schrenk (*Colletotrichum gloeosporioides* Penz.), leaf spot, dieback. Tex. (1), Fla. (2).
Helicobasidium purpureum (Tul.) Pat., root rot. Tex. (1).
Meliola sapindacearum Speg. and *M. sapindii* F.L. Stevens, black mildew. C.Z., P.R. (2).
Mycosphaerella sapindii (Ell. & Ev.) Lindau, leaf spot. Mo. (1).
Phomopsis sp., on twigs. Okla. (1).
Phoradendron flavescens (Pursh) Nutt. and var. *macrophyllum* Engelm., mistletoe. Ariz., N.Mex., Tex. (1).
Phyllosticta sapindii P. Henn., leaf spot. Fla. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Okla., Tex. (1). Reported resistant.
Uncinula circinata Cke. & Pk., powdery mildew. Tex. (1).

Mosaic—suspected virus. Tex. (1).

Serjania

Serjania spp.

Climbing, woody vines of tropical America, sometimes grown for ornament in the Far South.

Cephaleuros virescens Kunze, green scurf. P.R.
Meliola ambigua Pat. & Gaill., black mildew. C.Z., P.R.
M. serjaniae F.L.Stevens and var. *dentata* F.L.Stevens. P.R.
Phyllachora sapindacearum F.L.Stevens, black leaf spot. C.Z.
P. serjaniicola Chardon—C.Z., P.R.
Puccinia arechavaletae Speg. (III), rust. Tex., P.R.

Ungnadia

U. speciosa Endl., Mexican-buckeye.

Deciduous shrub or small tree. Range 11,16, 17,20,29,30. Sometimes grown for ornament and as a source of honey.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

SAPOTACEAE

Achras

A. zapota L., sapodilla.

Evergreen tree of tropical America, extensively cultivated there for its edible fruit.

Pestalotia scirrofaciens N.A.Brown, "limb gall." Fla., Tex.
Phyllosticta sp. (not *P. sapotae* Sacc.), on leaves? Fla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Septoria sp.—Fla.
Uredo sapotae Arth. & J.R.Johnston (II), rust. Fla.

Bumelia

(1) *B. lanuginosa* (Michx.) Pers., gum bumelia, chittimwood, false-buckthorn. Range 11,14,17,19,20,22,25,29,30,31,32.
(2) *B. lycioides* (L.) Pers., buckthorn bumelia. Range 17,25,27,28,29,30.

Shrubs or small trees.

Cercospora lanuginosa Heald & Wolf, leaf spot. Tex. (1).
Guignardia bumeliae J.H.Miller & G.E.Thompson, on fallen leaves. Ga. (2).
Helicobasidium purpureum (Tul.) Pat. (*Rhizoctonia crocorum* DC. ex Fr.), root rot. Tex. (1).
Mycosphaerella bumeliae (Cke.) J.H.Miller—Ga. (species not designated).
Phoma bumeliae House, on stems. Ala., Miss. (1).
Phyllosticta bumeliifolia Heald & Wolf, leaf spot. Ala. (1,2), Tex. (1); Miss. (2).
P. curtisii (Sacc.) Ell. & Ev.—Fla., Mo., Tex. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Polystigma bumeliae Schw., on leaves. Ark. (2).
Septoria bumeliae Sacc., leaf spot. Tex. (1), Miss. (2).

Chrysophyllum

C. cainito L., star-apple; and *C. oblongifolius* Michx., deer-plum.

C. cainito an evergreen tree of tropical America, cultivated in southern Florida; *C. oblongifolius* a shrub in range 29 and 30.

Asterina chrysophylli P.Henn. and *A. sydowiana* Ryan, on leaves. P.R.
Botryosphaeria ribis Gross. & Dug., on branches. West Indies.
Diplodia natalensis P.Evans, on branches. West Indies.
Meliola lucumae F.L.Stevens and *M. ocoteicola* F.L. Stevens, black mildew. P.R.
Uredo amicosa Arth. (II), rust. P.R.

Dipholis

Dipholis spp.

Tropical trees with milky juice and plumlike fruit; some of timber value; native of southern Florida and tropical America.

Meliola dipholidis F.L.Stevens, black mildew. P.R.
Scolecopeltella portoricensis Speg., black leaf spot. P.R.

Lucuma

Lucuma spp.

Shrubs or trees of tropical America, some bearing edible fruit, such as *L. nervosa* A. DC., canistel, cultivated and locally naturalized in Florida; other species are of timber value.

Acrotelium lucumae (Arth. & J.R. Johnston) Cumm. (II,III), rust. Fla.
Colletotrichum gloeosporioides Penz., fruit spot. Fla.
Meliola lucumae F.L.Stevens, black mildew. P.R.
Pestalotia lucumae Tehon, on leaves. P.R.
Physalospora obtusa (Schw.) Cke., on branches. S.C.

Sideroxylon

Sideroxylon spp., chiefly *S. foetidissimum* Jacq., mastic.

Small evergreen trees of tropical America, including southern Florida; used in cabinet work.

Halstedia portoricensis F.L.Stevens, black leaf spot. Fla., P.R.
Meliola sideroxyli F.L.Stevens, black mildew. T.H.
Polyporus hirsutus Wulf. ex Fr., wood rot. Fla.
Trametes hynoides Sw. ex Fr., wood rot. Fla.

SARRACENIACEAE

Darlingtonia

D. californica Torr., California-pitcherplant.

Perennial herb of California and Oregon; grown for novelty in gardens and greenhouses.

Mycosphaerella sarraceniae (Schw.) House, leaf spot. Calif.
Septoria darlingtoniae Dearn. & House, leaf spot. Oreg. Antedated by *S. chrysamphorae* Ell. & Ev., apparently a nomen nudum, reported in Calif.; probably the conidial stage of *Mycosphaerella sarraceniae*.

Sarracenia, pitcherplant, huntsmanscup

(1) *S. purpurea* L., common pitcherplant.
(2) Other species.

Perennial, insectivorous herbs of bogs and marshes mostly in the Southeastern and Gulf States; (1) occurs throughout eastern North America; grown in wild gardens and under glass for novelty.

Colletotrichum gloeosporioides Penz., leaf spot. N.J. (1), Tex. (2).
Helminthosporium sarraceniae MacM., secondary leaf spot. Minn. (1).
Mycosphaerella sarraceniae (Schw.) House, leaf spot. Maine, Mich., Minn., N.Y., Pa. (1); Ga., Miss., S.C. (2).
Peckia sarraceniae Pk. & G.W.Clint., on leaves. Mich., N.Y. (1).
Pestalotia aquatica Ell. & Ev., secondary leaf spot. Minn. (1); Md., Tex. (2).
Pyrenopeziza atrata (Pers. ex Fr.) Fckl., on leaves. Minn. (1); Fla., Ga. (2).
Pythium graminicola Subr., root rot. N.C. (2).
Rhizoctonia solani Kuehn, root rot. Tex. (2).
Sclerotium rolfsii Sacc., southern blight. Tex. (2).

SAURURACEAE

Saururus

S. cernuus L., lizardtail, water-dragon, swamp-lily.

Perennial herb of bogs in the Eastern and Central States and southward; sometimes grown in wild gardens and useful to wildlife.

Cercospora saururi Ell. & Ev., leaf spot. Ala., Fla., Ill., Ind., La., N.Y., Tex. Also reported as *Ramularia saururi* (Ell. & Ev.) Tharp, q. v.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. U.S., no place specified.

Physoderma sp., leaf gall. Va.

Ramularia saururi (Ell. & Ev.) Tharp, leaf spot. Okla.

SAXIFRAGACEAE

Astilbe

Astilbe spp.

Perennial, strong herbs, mostly of China and Japan, grown in gardens and as pot plants under glass; also one native species in the eastern United States, rarely cultivated.

Erysiphe polygoni DC., powdery mildew. Mass.

Fusarium sp., wilt. Wash.

Decumaria

B. barbara L.

Climbing shrub of range 28,29,30; also cultivated in zone 5 and southward.

Cercospora decumariae Tracy & Earle, leaf spot. Miss.

Deutzia

Deutzia spp.

Ornamental shrubs of eastern Asia and the Himalayan region, widely cultivated.

Cercospora deutziae Ell. & Ev., leaf spot. Del., Iowa, Tex.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Meloidogyne spp., root knot nematodes. Miss., Tex.

Phyllosticta deutziae Ell. & Ev., leaf spot. Ala., Iowa, N.J., Tex.

Fendlera

Fendlera spp.

Ornamental, dryland shrubs of southwestern United States; grown for the handsome white flowers.

Gymnosporangium speciosum Pk. (*G. gracilens* Kern & Bethel) (O,I), rust. Ariz., Colo., N.Mex., Utah. II and III on *Juniperus* spp.

Teichospora fendlerae (Earle) Sacc. & D.Sacc., on twigs. Colo.

Heuchera, alumroot

(1) *H. americana* L.
(2) *H. sanguinea* Engelm., coralbells.
(3) Other species.

Native perennial herbs, more frequently in the Western States but several species in the Eastern and Central States: (1) is useful to wildlife and (2) is widely grown for ornament.

Aphelenchoides fragariae (Ritz.-Bos) Christie, leaf nematode. Calif. (2).

Cercospora heucherae Ell. & G.Martin, leaf spot. Ind., Ohio, Pa., Va., W.Va. (1); Ill., Ind., Iowa, Wis. (3).

Colletotrichum heucherae Ell. & Gall.—Ill.

Dothidella heucherae Ell. & Ev., on leaves. Wash (3).

Erysiphe cichoracearum DC., powdery mildew. Calif. (3).

Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Mont. (3).

Phyllosticta excavata Sacc., leaf spot. Idaho, Alaska (3).

Puccinia heucherae (Schw.) Diet., (III), rust. Pa. to N.C. and S.Dak. (1); Calif. (2); throughout the Western States and Alaska (3).

Pythium hypogynum Middleton and *P. ultimum* Trow, root rot. ?Mo. (3).

Ramularia mitellae Pk. var. *heucherae* Dearn., leaf spot. Wash. (3).

Septoria heucherae Pass., leaf spot. Ind. (1).

S. saxifragae Pass.—W.Va. (1), Wash. (2).

Sphaerotheca humuli (DC.) Burr., powdery mildew. Mont., N.Mex. (3).

Urocystis lithophragmae Garrett, leaf and stem smut. Utah (3).

Hydrangea, hydrangea

(1) *H. arborescens* L., smooth hydrangea, and other native species.

Deciduous flowering shrub; frequently planted. Range 22,24,25,27,28,29,30.

(2) *H. macrophylla* Ser. (*H. hortensia* DC., *H. opuloides* K. Koch, *Hortensia opuloides* Lam.), house hydrangea, hortensia.

Flowering shrub of Japan, cultivated in numerous horticultural varieties in the open in zone 6 and southward and commonly in greenhouses.

(3) *H. paniculata* Sieb., panicle hydrangea; including records for *H. petiolaris* Sieb. & Zucc., climbing hydrangea, and reports on *Hydrangea* sp.

Shrub or small tree of China and Japan, cultivated in zone 4. The Peegee hydrangea, *H. paniculata* var. *grandiflora* Sieb., is the most widely cultivated type.

Ascochyta hydrangeae Arn., leaf spot. N.J. (2,3), Alaska (3).

Botrytis cinerea Pers. ex. Fr., gray-mold blight. Cosmopolitan (2,3).

Cercospora sp. (*?C. hydrangeae* Ell. & Ev.), leaf spot. Fla., Md., P.R. (2).

C. aborescentis Tehon & Daniels, leaf spot. Ill., Okla. (1).

C. hydrangeae Ell. & Ev., leaf spot. Okla. (1,2); Tex. (reported as *C.* sp.) on (1); described on cultivated *Hydrangea* in Ala.

C. hydrangeana Tharp—Va. to Ala. and Tex. (3); probably a synonym of the preceding.

Colletotrichum sp., leaf spot. Md., N.J. (2).

Cytospora sphaerocephala (Schw. ex Fr.) Sacc., on branches. W.Va. (1), S.C. (3).
Diaporthe eres Nits. (*D. hydrangeae* Ell. & Ev.), on dead branches. W.Va. (1).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode disease. U.S., no place specified (2).
Erysiphe polygoni DC., powdery mildew. Md., W.Va. (1); Ohio, Minn. (reported as *Oidium* sp.) on (2); General (3).
Gloeosporium sp., leaf spot. P.R. (2).
Hendersonia hydrangeae Fairm., on branches. N.Y. (3).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Leptosphaeria vagabunda Sacc., on branches. W.Va. (1).
Meloidogyne spp., root knot nematodes. Miss., Okla., Tex. (3).
Microsphaera polonica Siem. (*Oidium hortensiae* Jørst.). Wash. (2). ?In the U.S.
Nectria cinnabarina Tode ex Fr., on branches. Va. (3).
Oidium sp. (probably *Erysiphe polygoni* DC.), powdery mildew. Md., Pa., Va. (2).
Phyllosticta hydrangeae Ell. &Ev., leaf spot. Ind. (1); Del., N.J. (2); widespread (3).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).
Polyporus versicolor L. ex. Fr., wound rot. Conn., Iowa, Md. (3).
Pratylenchus pratensis (De Man) Filip., in roots. Tex. (3).
Pseudomonas solanacearum E.F.Sm., bacterial wilt. N.Y. (1).
Pucciniastrum hydrangeae (Berk. & Curt.) Arth. (II, III), rust. Pa. to N.C., Ark., and Ill. (1); Pa. to N.C., W.Va., and Ind. (3). O and I on *Tsuga canadensis* (L.) Carr. and *T. caroliniana* Engelm. Reported also on *H. radiata* Walt. by Overholts. Olive uses *Thekospora*.
Rhizoctonia solani Kuehn, stem rot. Md. (2) in greenhouse.
Sclerotium rolfsii Sacc., southern blight. Fla., Tex. (3).
Septoria hydrangeae Bizz., leaf spot. Conn., Miss., Ohio (3).
Venturia anthophila Pass., on inflorescences. Md., Minn. (3).
Xanthomonas solanacearum (E.F.Sm.) Dows.: See *Pseudomonas solanacearum*.

Chlorosis—physiogenic, often iron deficiency or excess lime. (2).

Jamesia

J. americana Torr. & Gray, cliffbush.

Attractive, upright, deciduous shrub of Western States, sometimes grown for ornament.

Ovularia edwiniae Clem.—Colo.

Lithophragma

Lithophragma spp., woodland-star.

Several small perennial herbs of the Far West, sometimes grown in rock gardens.

Puccinia heucherae (Schw.) Diet. (III), rust. Calif., Utah, Wash.
Urocystis lithophragmae Garrett, leaf and stem smut. Utah.

Mitella

(1) *M. diphylla* L., bishopscap, mitrewort.
(2) Other species.

Woodland perennial herbs: (1) in the Eastern and Central States, (2) in the Far West; sometimes grown in wild gardens.

Cercospora mitellae Hicks. (nomen nudum), leaf spot. Mich. (1).
Phyllosticta mitellae Pk., leaf spot. N.Y., Wis. (1).
Puccinia heucherae (Schw.) Diet. (III), rust. N.Y. to Tenn., Iowa, and Wis. (1); Maine to Minn., also Mont. to Colo., Calif., and Wash. (2).
Ramularia mitellae Pk., leaf spot. Ill., Ind., Mich., N.Y. (1).
Sclerotium deciduum J.J.Davis (=*Ceratobasidium anceps* (Bres. & Syd.) Jacks.), leaf rot. Wis.
Septoria mitellae Ell. & Ev., leaf spot. Mich., Wis. (1)
Sphaerotheca humuli (DC.) Burr., powdery mildew. Wis. (1).

Parnassia, grass-of-Parnassus

(1) *P. caroliniana* Michx.
(2) Other species.

Perennial herbs of wet meadows, widely distributed in the United States; several species may be grown in wild gardens; (1) is useful to wildlife.

Erysiphe polygoni DC., powdery mildew. N.Y. (1).
Puccinia parnassiae Arth. (III), rust. Utah (2).
P. uliginosa Juel (I), rust. Alaska (2). II and III on *Carex* spp. in Europe.

Philadelphus, mockorange

Philadelphus spp.

Deciduous, showy-flowered shrubs, including about 10 native species in the United States, most of which have ornamental value and have been introduced into cultivation, hardy in zone 4; of these the best known is *P. grandiflorus* Willd.; also several European (*P. coronarius* L.) and east Asian species, together with hybrids, are widely grown for ornament, zone 4 and 5.

Ascochyta philadelphi Sacc. & Speg., leaf spot. N.Y.
Botrytis cinerea Pers. ex Fr., flower and shoot blight. Cosmopolitan in humid regions.
Cercospora angulata Wint., leaf spot. Mo., Tex.
Diplodia microspora Berk. & Cke., on twigs. Maine.
Gymnosporangium speciosum Pk. (O,I), rust. Colo., N.Mex., Tex., Utah (on *P. argyrocalyx* Woot., *P. microphyllus* Gray, and *P. occidentalis* A.Nels.); *P. coronarius* is susceptible. III on *Juniperus monosperma* (Engelm.) Sarg., *J. pachyphloea* Torr., and *J. utahensis* (Engelm.) Lemmon.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md.
Nectria cinnabarina Tode ex Fr., on twigs. Maine, Pa.
Phoma philadelphi Cke., on twigs. Oreg.
Phomopsis landeghemiae (Sacc.) Hoehn., on twigs. Maine, Va. Conidial stage of *Diaporthe eres* Nits.
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Mont., Wash.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Polyporus hirsutus Willd. ex Fr. and *P. versicolor* L. ex. Fr., on dead branches. Oreg.
Ramularia philadelphi Sacc., leaf spot. Tex., Wash.
Sarcinella heterospora Sacc., sooty blotch. Fla.
Septoria philadelphi Ell. & Ev., leaf spot. Idaho, Iowa, Mont., Wash.

Ribes,[18] currants and gooseberries

I. Currants Cultivated for Fruit

Ribes spp., including *R. sativum* (Reichb.) Syme, common or garden red currant; *R. rubrum* L., northern red currant; and *R. nigrum* L., European black currant.

The familiar upright shrub *R. sativum*, a native of western Europe, is cultivated in zone 4 and locally naturalized in the Eastern and North Central States; *R. rubrum* is a native of central and northern Europe and Asia, not cultivated as such in the United States but a progenitor of the small-fruited but very hardy currant hybrids, zone 3; *R. nigrum*, a native of Europe to central Asia, cultivated in zone 4, and planted for its fruit used in cookery and for conserves.

Alternaria sp., leaf spot. Mich.

Armillaria mellea Vahl ex Fr., root rot. Calif., Oreg., Wash.

Botryosphaeria ribis Gross. & Dug. and var. *chromogena* Shear, N.E.Stevens, & M.S. Wilcox, cane blight. Mass. to Va. and Ill.; Calif. The nonchromogenic form is probably saprophytic.

Botrytis cinerea Pers. ex Fr., dieback, leaf spot, gray mold of fruit. New England States, Oreg., Wash.

Cenangium ribis Fr. (*?Scleroderris ribis* (Fr.) Keissler), on twigs. Calif.

Cercospora angulata Wint., angular leaf spot. N.Y. to Va., Kans., and Minn.

C. ribis Earle—Ala., Ind., Iowa.

Corticium stevensii Burt: See *Pellicularia koleroga*.

Cronartium ribicola Fisch. v. Waldh. (II,III), white pine blister rust. Maine to Va., Ill., and Minn.; Oreg., Wash. O and I on 5-needle pines. The var. Viking (*R. petraeum* Wulf. × *R. rubrum*) is highly resistant.

Cylindrosporium ribis J.J.Davis, leaf spot. Wis.

Cytospora grossulariae Laubert, on twigs. Md.

Dothidella ribesia (Pers. ex Fr.) Th. & Syd.: See *Phragmodothella ribesia*.

Dothiorella ribis (Fckl.) Sacc.: See *Botryosphaeria ribis*.

Fomes ribis (Schum. ex Fr.) Gill., collar rot. N.Y. to Ind. and Minn.; Utah.

Gloeosporium ribis (Lib.) Mont. & Desm. (*Gloeosporidiella ribis* (Lib.) Petr): See *Pseudopeziza ribis*.

Glomerella cingulata (Ston.) Spauld. & Schrenk, berry rot. Conn., Pa.

Hypholoma perplexum Pk., root rot. N.Y.

Leptosphaeria coniothryrium (Fckl.) Sacc., on canes. Alaska, N.Y.

L. vagabunda Sacc.—Mich.

Macrophoma hyalina (Berk. & Curt.) Berl. & Vogl.: See *Physalospora obtusa*.

Microsphaera grossulariae (Wallr.) Lév., European powdery mildew. Mont., Nebr., N.H.

Mycosphaerella ribis (Fckl.) Feltg. (*Septoria ribis* Desm.), leaf spot. Maine to Md., Ark., Oreg., and Wash. The change from the more familiar *M. grossulariae* (Fr.) Lindau is due to the fact that *Sphaeria grossulariae* Fr. on which this is based appears to be a quite different fungus from that causing leaf spot. The latter was described as *Sphaerella ribis* Fckl. in 1869; the change to *Mycosphaerella* is often ascribed to Klebahn (1918) but was published by Feltgen in 1899.

Nectria cinnabarina Tode ex Fr., coral spot, canker, dieback. Maine to Colo. and Wash.; Alaska.

N. ditissima Tul. (*?N. coccinea* Pers. ex Fr.), canker. Minn., N.Y.

Pellicularia koleroga Cke., thread blight. Fla.

Phragmodothella ribesia (Pers. ex Fr.) Petr., black pustule, dieback. New England States, Pacific Northwest, Alaska.

Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Mich.

Phyllosticta grossulariae Sacc., leaf spot. N.J., N.Y., Oreg., Wis. Spermatial stage of *?Mycosphaerella ribis*.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Physalospora obtusa (Schw.) Cke., on dead canes. Mass. to Va. and Mich.

Plasmopara ribicola Schroet. ex J.J.Davis, downy mildew. W.Va. to Wash.; Wis. Reported on *R. glandulosum* Grauer and *R. triste* Pall.

Plowrightia ribesia (Pers. ex Fr.) Sacc.: See *Phragmodothella ribesia*.

Pseudopeziza ribis Kleb. (*Gloeosporium ribis* (Lib.) Mont. & Desm.), anthracnose, leaf, stem, and fruit spot. General. Some authors have called this *Drepanopeziza ribis* (Kleb.) Hoehn.

Puccinia caricis (Schum.) Schroet. var. *grossulariata* Arth. (O,I), rust. Conn., Ind., Md., N.Y., S.Dak., Alaska. II and III on *Carex* spp..

P. ribis DC. (III), rust. Ohio to Minn. and Nebr.

Septoria ribis Desm. (*S. grossulariae* (Lib.) West. and *S. sibirica* Thuem.): See *Mycosphaerella ribis*.

Sphaeropsis hyalina Berk. & Curt. and *S. ribicola* Cke. & Ell.: See *Physalospora obtusa*.

Sphaerotheca mors-uvae (Schw.) Berk. & Curt., American powdery mildew. Calif., Conn., Iowa, Mont., Nebr., Wash., Alaska.

Thyronectria berolinensis (Sacc.) Seaver, cane knot. Conn. to Ind., Kans., and Utah.

Verticillium sp., wilt. N.Y.

Xylaria ?mali Fromme—Ill.

MOSAIC—undetermined virus. On red currants in Md., N.Y. Red currants when mosaic-infected are also susceptible to tobacco ring spot virus (*Annulus tabaci* Holmes, Nicotiana virus 12 K.M.Sm.), as noted by Hildebrand in N.Y.

CRINKLE LEAF—cause unknown. N.Y.

WITCHES'-BROOM—cause unknown. N.Y.

YELLOW LEAF—cause unknown. N.Y.

II. Currants Cultivated for Ornament

Ribes spp., including *R. aureum* Pursh, golden currant; *R. odoratum* Wendl., clove currant, buffalo currant: *R. sanguineum* Pursh, red-flowered currant; and *R. alpinum* L., alpine currant.

R. aureum a slender shrub or bush of range 1,2,3,4.6,7.8,9.11,12.13,14,15.22,23. cultivated in zone 2: *R. odoratum* a shrub of range 15,16,18, 19,20,22,23,25, cultivated in zone 4 and planted for its fragrant flowers: *R. sanguineum* a shrub of range 1,2,4, cultivated in zone 5. Several other native currant species, some varieties of *R. nigrum* L., and *R. alpinum*, a spreading, dense shrub of Europe, are also grown for ornament.

Botryosphaeria ribis Gross. & Dug., dieback. Kans.

Botrytis cinerea Pers. ex Fr., fruit rot, dieback, ?witches'-broom. Ind., N.Y., Alaska.

[18] The numerous species of *Ribes* are here grouped as follows: I. currants cultivated for fruit; II. currants cultivated for ornamental; III. cultivated gooseberries; and IV. native species, both currants and gooseberries, chiefly furnishing food for wildlife.

Cercospora angulata Wint., angular leaf spot. Minn.
C. ribicola Ell. & Ev., leaf spot. Oreg., Wash.
Coleosporium jonesii (Pk.) Arth. (II,III), rust. Minn. to Ariz. and Idaho. O and I on *Pinus edulis* Engelm. (=*P. cembroides* Zucc. var. *edulis* Voss).
Cronartium occidentale Hedgc., Bethel, & Hunt, pinon blister rust. Mont. to N.Mex., Calif., and Wash.; especially on *R. aureum*. O and I on *P. monophylla* Torr. & Frém. and *P. edulis*.
C. ribicola Fisch. v. Waldh. (II,III), white pine blister rust. Maine to Md., Colo., and Minn. (on *R. aureum* or *R. odoratum*); on *R. sanguineum* in the Pacific Coast States. Some pistillate clones of *R. alpinum* are susceptible but at least one staminate clone is immune.
Glomerella cingulata (Ston.) Spauld. & Schrenk, berry rot. Conn.
Marssonina ribicola (Ell. & Ev.) P. Magn., leaf spot. Colo.
Melampsora ribesii-purpureae Kleb. (O,I), rust. On *R. aureum* in Utah. II and III on *Salix* spp.
Mycosphaerella aurea (Ell. & Ev.) Stone (*Septoria aurea* Ell. & Ev. and var. *destruens* Ell. & Ev.), leaf spot. N.Y. to Kans. and S.Dak.; Wash.
M. ribis (Fckl.) Feltg., leaf spot. N.Y. to Kans. and Minn.; Utah.
Nectria cinnabarina Tode ex Fr., coral spot, dieback. Alaska, Kans.
Phragmodothella ribesia (Pers. ex Fr.) Petr., black pustule, dieback. N.Y.
Phyllosticta grossulariae Sacc., leaf spot. Ind.
Pseudomonas ribicola Bohn & Maloit, bacterial leaf spot. On *R. aureum*.
Pseudopeziza ribis Kleb., anthracnose. Iowa, Minn., Mont.
Puccinia caricis (Schum.) Schroet. var. *grossulariata* Arth. (O,I), rust. N.Y. to Iowa, Calif., and Oreg.; Alaska.
P. micrantha Griff. (O,I), rust. On *R. aureum* in Nebr., Wyo. II and III on *Oryzopsis micrantha* (Trin. & Rupr.) Thurb.
P. parkerae Diet. & Holw. (III), rust. On *R. sanguineum* in Wash.
Septoria aurea Ell. & Ev.: SEE *Mycosphaerella aurea*.
S. sanguinea Dearn., leaf spot. Wash.
Thyronectria berolinensis (Sacc.) Seaver, cane knot. Kans.

III. Cultivated Gooseberries

Ribes spp., including *R. grossularia* L., European gooseberry, and *R. hirtellum* Michx., hairystem gooseberry.

R. grossularia a shrub of Europe and western Asia, parent of horticultural varieties, infrequently cultivated in the United States, zone 4, and of hybrids with *R. hirtellum*, a shrub of range 15,18,21,23,24,26,27, principal source of American cultivated varieties, zone 3.

Aphelenchoides ribes (A.M.Taylor) Goodey, infesting buds. Calif.
Armillaria mellea Vahl ex Fr., root rot. Oreg., Wash.
Botryosphaeria ribis Tode ex Fr., cane blight. N.J., Va.
Botrytis cinerea Pers. ex Fr., dieback. Conn., Oreg., Wash.
Cercospora angulata Wint., leaf spot. N.Y. to Mich. and Mo.
Coleosporium jonesii (Pk.) Arth. (II,III), rust. Colo., Minn., N.Mex., Wis., Wyo.
Corticium stevensii Burt: SEE *Pellicularia koleroga*.
Cronartium occidentale Hedgc., Bethel, & Hunt (II,III), rust. Ariz., Colo., Utah.
C. ribicola Fisch. v. Waldh. (II,III), rust. Vt. to Va. and Minn.; Calif. Chiefly on American gooseberries, the European varieties being resistant.
Cuscuta sp., dodder. Minn., N.Y.
Dematophora sp., root rot. N.Y.
Diaporthe eres Nits. (*D. concrescens* (Schw.) Cke. and *D. pungens* Nits.), on twigs. Alaska.
Diplodina grossulariae Sacc. & Briard, on ?twigs. Oreg.
Hendersonia grossulariae Oud., on canes. N.Y.
Leptosphaeria coniothyrium (Fckl.) Sacc. (*Coniothyrium fuckelii* Sacc.), cane blight. Ind., Mo.
L. vagabunda Sacc. (*?Coniothyrium ribis* Brun.), on canes and twigs. Alaska.
Marssonina grossulariae (Oud.) P. Magn., leaf spot. Ohio, Wis. (*?Septoria ribis* Desm.)
Microsphaera grossulariae (Wallr.) Lév., European powdery mildew. Calif., Idaho.
Mycosphaerella ribis (Fckl.) Feltg. (*Septoria ribis* Desm.), leaf spot. Mass. to Va., Kans., and Minn.; Oreg. to Alaska.
Nectria cinnabarina Tode ex Fr., coral spot, dieback. Minn.
Pellicularia koleroga Cke., thread blight. Fla.
Phoma ribis Ell. & Barth., on twigs. Kans.
Phragmodothella ribesia (Pers. ex Fr.) Petr., twig knot, dieback. Iowa, Oreg.
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. N.Y.
Phyllosticta grossulariae Sacc., leaf spot, fruit spot. Conn., N.J., Wash., Wis.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., dieback. N.Y. to Va. and Kans.
Plasmopara ribicola Schroet., downy mildew. Minn., Oreg., Wis., W.Va.
Pseudopeziza ribis Kleb., anthracnose. General.
Puccinia caricis (Schum.) Schroet. var. *grossulariata* Arth. (O,I), rust, on leaves and fruit. Maine to Md., Miss., Kans., and Idaho; Alaska. II and III on *Carex* spp.
P. caricis var. *uniporula* (Orton) Arth. (O,I), rust. Iowa, Md., N.Y., Wis. II and III on *Carex* spp.
Ramularia sp., leaf spot. Mich.
Sphaceloma ribis Jenkins & Bitanc., "scab," on leaves. Wash.
Sphaerotheca humuli (DC.) Burr., powdery mildew. Ind., Minn.
S. mors-uvae (Schw.) Berk. & Curt., American powdery mildew. General.
Xylaria hypoxylon (Fr.) Grev., black root rot. Oreg.
MOSAIC—unidentified virus. Ill., N.Y.
LEAF BLOTCH—magnesium deficiency. Oreg.
LEAF SCORCH—potassium deficiency.
ROSETTE—cause unknown. Del.

IV. Miscellaneous Native Species

Ribes spp.

Shrubs, some furnishing edible fruit, such as *R. americanum* Mill., American black currant, *R. hudsonianum* Rich., Hudson Bay currant, *R. triste* Pall., swamp red currant, *R. inerme* Rydb., whitestem gooseberry, and *R. oxyacanthoides* L., northern gooseberry; some species are grown for ornament, such as *R. cereum* Dougl., wax currant, and *R. speciosum* Pursh, fuchsia-flowered gooseberry.

Armillaria mellea Vahl ex Fr., root rot. Wash.
Asteroma ribicola Ell. & Ev., on leaves. Mont., N.Y., Wis.
Botryosphaeria ribis Gross. & Dug. and var. *chromogena* Shear, N.E.Stevens, & M.S.Wilcox, cane blight, dieback. Calif., Conn., Md., N.J.
Cenangella oricostata Cash, on twigs. Colo., Utah.

Cercospora angulata Wint., leaf spot. Kans.
C. coalescens J.J.Davis, on leaves. Wash.
C. ribicola Ell. & Ev.—Calif., Idaho, Oreg., Wash., Wis., Wyo.
C. ribis Earle—Kans., Wis.
Ceriospora ribis P. Henn. & Ploettn., on canes. Alaska, Oreg.
Cladosporium sp. and *C. herbarum* Lk., leaf blight. Alaska, Wash.
Clypeopycnis aeruginascens Petr., on twigs. Alaska, S.Dak.
Coleosporium jonesii (Pk.) Arth. (II,III), rust. Wis. to N.Mex., Calif., and Wash. on currants and gooseberries. O and I on *Pinus edulis* Engelm. (=*P. cembroides* Zucc. var. *edulis* Voss).
Coniophora corrugis Burt, wood rot. Wyo. to Ariz.
Cronartium occidentale Hedgc., Bethel, & Hunt (II,III), piñon blister rust. Idaho, Mont., Nebr., and Kans. to N.Mex., Calif., and Wash. Most commonly on *R. roezlii* Regel. O and I on *Pinus edulis* and *P. monophylla* Torr. & Frém. SEE ALSO note on following species.
C. ribicola Fisch. v. Waldh. (II.III), white pine blister rust. Maine to N.C., Tenn., Iowa, and Minn.; Mont. to Wash., Oreg., and Calif. O and I on 5-needle pines. *R. inerme*, *R. lacustre* (Pers.) Poir., *R. petiolare* Dougl., and *R. viscosissimum* Pursh are susceptible, but *R. leptanthum* A.Gray is somewhat resistant. *R. roezlii* is susceptible to both *C. occidentale* and *C. ribicola*, the form of this species in Calif. being more susceptible than the northern form in Oreg. and British Columbia.
Cucurbitaria ribis Niessl, on dead canes. Colo., Mont., N.Mex., Va.
Cylindrosporium ribis J.J.Davis, leaf spot. Idaho, N.Y., Wis. Ehrlich states that many supposed collections of *Septoria sibirica* Thuem. are really this; Davis later made this a synonym of *S. sibirica*.
Diaporthe eres Nits. (*D. concrescens* (Schw.) Cke.), on dead canes. Alaska.
D. strumella (Fr.) Fckl., on dead canes and twigs. Mass. to Mich. and Nebr.; Calif., Alaska.
Gloeosporium bartholomaei Dearn., leaf spot. Wash.
Godronia urceolus (Alb. & Schw. ex Fr.) Karst. (*?Mastomyces uberiformis* (Fr.) Karst.), on twigs. Alaska, Colo., N.Dak., N.J.
G. davidsoni Cash—Alaska, Calif., Colo.
Graphiothecium vinosum J.J.Davis, on leaves. Wis.
Hendersonia grossulariae Oud.—Va.
Leptosphaeria coniothyrium (Fckl.) Sacc., on canes. Ind.
L. vagabunda Sacc.—Utah.
Marssonina bracteosa Dearn. & Barth., on leaves. Alaska, Wash.
Melampsora ribesii-purpureae Kleb. (O,I), rust. Colo. to Calif. and Wash.; Idaho, Alaska. II and III on *Salix* spp.
Microsphaera grossulariae (Wallr.) Lév., European powdery mildew. Mont., N.H.
Mycosphaerella ribis (Fckl.) Feltg. (*Septoria ribis* Desm.), leaf spot. Mass. and N.Y. to Tenn. and Mo.; Idaho, the Pacific coast.
Nectria cinnabarina Tode ex Fr., canker, dieback. Widespread.
Pezizella oenotherae (Cke. & Ell.) Sacc., on leaves. Maine, Md.
Phragmodothella ribesia (Pers. ex Fr.) Petr. (*?P. kelseyi* (Ell. & Ev.) Th. & Syd.), twig knot. Conn. to Miss. and Wis.; Colo. to Mont. and Oreg.; Alaska.
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew. Idaho, Ill., N.C.; Calif., Wash.
Phyllosticta spp., on leaves. Records include: *P. canescens* Ell. & Ev.—Idaho; *P. ellisii* Sacc. & D. Sacc.—W.Va.; *P. grossulariae* Sacc.—Mich. to Ind., Kans., and Wis., on *R. missouriense* Nutt. in Wis.; *P. ribesicida* Speg.—Alaska; *P. ribis* Speg.—Va.
Physalospora obtusa (Schw.) Cke., on dead branches. Maine to N.J. and Mich.
Plasmopara ribicola Schroet., downy mildew. Va. to Wis. and Wash.; reported on *R. cynosbati* L. and *R. gracile* Auct.
Polyporus planus Pk., on dead canes. N.C.
Pseudopeziza ribis Kleb. (*Gloeosporium ribis* (Lib.) Mont. & Desm.), anthracnose. Widespread. Gooseberries are generally more severely infected than currants, but some species in each group are resistant.
Pseudovalsa ribesia Sacc. & Scalia, on twigs. Alaska.
Puccinia caricis (Schum.) Schroet. var. *grossulariata* Arth. (O,I), rust. Maine to Mo., Calif., and Alaska. On various *Ribes* spp., both currants and gooseberries. II and III on *Carex* spp.
P. caricis var. *uniporula* (Orton) Arth. (O,I), rust. N.H. to Ind., Iowa, and Wis. Reported chiefly on cultivated and native gooseberries. II and III on *Carex* spp.
P. micrantha Griff. (O,I), rust. Colo., Mont., Nebr., S.Dak., Utah, Wyo. On currants and gooseberries. II and III on *Oryzopsis micrantha* (Trin. & Rupr.) Thurb.
P. parkerae Diet. & Holw. (III), rust. Alaska to Mont. and Oreg. On currants and gooseberries.
P. ribis DC. (III), rust. Maine to Minn. and Nebr.; Wash. On cultivated and native currants.
Ramularia sp., leaf spot. Mich.
Rhabdospora ribicola (Berk. & Curt.) Sacc., on twigs. Wis.
Rhynchophoma raduloides Sacc. & Scalia — Calif., Alaska.
Rosellinia parasitica Ell. & Ev., on dead canes. Idaho, N.Mex.
Scleroderris lobata Cash, on dead twigs. Calif.
S. tumoricola Cash, on twig galls. Colo.
Septoria ribis Desm. (*S. grossulariae* (Lib.) West., *S. sibirica* Thuem.): SEE *Mycosphaerella ribis*.
S. sanguinea Dearn., leaf spot. Wash.
Sphaerotheca humuli (DC.) Burr., powdery mildew. Mont., Alaska.
S. mors-uvae (Schw.) Berk. & Curt., American powdery mildew. Maine to Mo., Calif., and Wash.; Alaska. On both currants and gooseberries.
Thelephora terrestris Ehr. ex Fr., stem girdle. N.H.
Thyronectria berolinensis (Sacc.) Seaver, on canes and twigs. Md. to Ohio, S.Dak., and Oreg.
Valsa spp., on dead twigs and canes. Species reported include: *V. ambiens* Pers. ex Fr.—N.J.; *V. ribesia* Karst.—Calif.; *V. ribicola* Ell. & Ev.—Kans., Mo.

Saxifraga, saxifrage

(1) *S. arguta* D. Don
(2) *S. flagellaris* Willd.
(3) *S. mertensiana* Bong.
(4) *S. pensylvanica* L., swamp saxifrage.
(5) *S. virginiensis* Michx., early saxifrage.
(6) Other species.

Numerous small herbs, mostly perennial and of alpine habitats: (1,2,3) in the Far West and North, (4,5) of the Eastern States; many species introduced from Europe for use in rock and alpine gardens.

Asteroma saxifragae Ell. & Ev., on leaves. Alaska (6).
Botrytis cinerea Pers. ex Fr., gray mold. Alaska (6).
Cercosporella saxifragae Rostr., leaf spot. Wis. (4).
Dothidella sphaerelloides Dearn., on leaves. Alaska (6).
Laestadia saxifragae Sacc. & Scalia, on leaves. Alaska (6).

Melampsora arctica Rostr. (O,I), rust. Colo. (2), Alaska (6). II and III on *Salix* spp.
Mycosphaerella sp. (*Sphaerella trichophila* Karst. f. *saxifragae* Dearn.), on leaves. Alaska (6).
Phyllosticta saxifragarum Allesch., leaf spot. Wyo. (1).
Puccinia heucherae (Schw.) Diet. (III), rust. Mont. to N.Mex. and Wash. (1); Idaho, Wash., Wyo. (3); N.Y. to Ill. and Minn. (4); Conn. to Md. and Ohio (5); throughout the Western States and Alaska (6).
P. pazschkei Diet. (III), rust. Idaho, Mont., Wash. (3).
P. turrita Arth. (III), rust. Colo., Utah (6).
Ramularia sp., leaf spot. Alaska (6).
Septoria albicans Ell. & Ev., leaf spot. Wis. (4).
Sphaerotheca humuli (DC.) Burr., powdery mildew. N.Y. (5), Alaska (6).
S. humuli var. *fuliginea* (Schlecht.) Salm.—Wyo. (1,6), Pa. (5), Colo. (6).

Tellima

T. grandiflora (Pursh) Dougl.
Perennial herb of the Pacific coast, sometimes grown in wild gardens.

Puccinia heucherae (Schw.) Diet. (III), rust. Calif., Oreg., Wash., Alaska.
Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Alaska.

Tiarella

(1) *T. cordifolia* L., foamflower.
(2) Other species.
Perennial, erect, woodland herbs: (1) in the Eastern and Central States; (2) in the Pacific Coast States or introduced; sometimes grown in wild gardens.

Puccinia heucherae (Schw.) Diet. (III), rust. Conn. to N.C. and Tenn., also Colo., Mich., Wis. (1); Calif., Idaho, Mont., Oreg., Wash., Alaska (2).
Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Alaska (2).

Whipplea

W. modesta Torr.
Trailing shrub of range 1 and 4, sometimes planted for ornament, zone 7.

Peronospora whippleae Ell. & Ev., downy mildew. Calif.

SCROPHULARIACEAE

Antirrhinum

A. majus L., snapdragon.
Perennial herb of the Mediterranean region, widely grown for ornament, in the open as an annual plant and under glass for cut flowers.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. N.Y.
Botrytis cinerea Pers. ex Fr., gray-mold blight of leaves, stems, and blossoms. Cosmpolitan in greenhouses.
Colletotrichum antirrhini F.C.Stewart, anthracnose. General in the Eastern and Southern States to Colo. and Tex.
Cuscuta sp., dodder. Wash.
Fusarium sp., stem rot, wilt (?secondary). Conn., Fla., Ga., Okla., Tenn., Wash., P.R.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Macrophomina phaseoli (Maubl.) Ashby, charcoal stem rot. Okla.
Meloidogyne spp., root knot nematodes. General in the South from Md. to Fla., Tex., and Calif.; also in the North in greenhouses.
Oidium sp., powdery mildew. Mass., N.Y., Pa.
Peronospora antirrhini Schroet., downy mildew. Calif., N.Y., Okla., Oreg., Pa.
Phoma sp., stem rot. Conn., Ind., Mass., Mich., N.Y., Ohio, Va. Probably stem infection by *Phyllosticta antirrhini*, q. v. Also reported as *P. oleracea* Sacc. var. *antirrhini* Sacc. in Pa.
Phyllosticta antirrhini Syd., leaf spot, stem rot, canker. General in the Eastern and North Central States, also Tex. and Wash.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Phytophthora cactorum (Leb. & Cohn) Schroet., stem rot, wilt. Calif., Ill., Minn., N.J., N.Y.
P. cryptogea Pethyb. & Laff.—Calif., Okla.
P. parasitica Dast.—T.H.
Pratylenchus pratensis (De Man) Filip., root nematode. U.S., no place specified.
Puccinia antirrhini Diet. & Holw. (II,III), rust. General. Also on *A. nuttallianum* Benth. and *A. virga* A. Gray, native annuals of southern Calif. O and I are unknown.
Pythium spp., damping-off, root rot. Cosmopolitan. The following species have been identified, in Calif. unless otherwise stated: *P. debaryanum* Hesse—N. Dak. and Tex.; *P. irregulare* Buis.; *P. mamillatum* Meurs; *P. pulchrum* Mind.; *P. rostratum* Butl.; *P. ultimum* Trow; *P. vexans* d By.
Rhizoctonia solani Kuehn, damping off, collar rot. General.
Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. Calif., Ind., Mich., Pa., Tex.
S. minor Jagger—Conn.
Sclerotium rolfsii Sacc. (including reports as *S. delphinii* Welch) southern blight, stem rot. Calif., Fla., Miss., N.J., N.Y., Tex.
Thielavia basicola Zopf, on dead roots. Conn.
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Conn., N.J.
Verticillium albo-atrum Reinke & Berth., wilt. Calif., Conn., Maine, Mass., Minn., N.J., N.Y., Pa.
MOSAIC—virus(es). In part *Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm., reported in Fla.; in part unidentified, reported in Kans., N.Y., Ohio, Pa. Experimental infection with alfalfa mosaic, pea mottle, and tobacco mosaic viruses is reported.
RING SPOT—unidentified virus. Okla. Experimental infection with tobacco ring spot virus is reported.
FASCIATION—cause unknown, probably genetic. Occasional wherever grown.
TIP BLIGHT—cause unknown. Md., Okla., Va. A similar malady reported in Calif. has been shown to be caused by feeding injury of the aphid (*Myzus persicae* Sulz.).

Calceolaria, slipperwort

Calceolaria spp., probably mostly *C. crenatiflora* Cav.
Perennial herbs, sometimes woody, and a few annuals, of the Pacific coast region from Mexico to Chile; grown for ornament in the open in warm regions and, especially *C. crenatiflora*, under glass as a pot plant.

Botrytis cinerea Pers. ex Fr., gray mold. Alaska.
Pythium ultimum Trow and *P. mastophorum* Drechs., root rot. Calif.

Sclerotinia sclerotiorum (Lib.) d By., stem rot. N.Y., Wash.
Verticillium albo-atrum Reinke & Berth., wilt. N.Y., Wash.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif.
?BACTERIAL LEAF SPOT—N.J.
BORON DEFICIENCY—discoloration and necrosis of leaves. Calif.

Castilleja, painted-cup, Indian paintbrush

(1) *C. californica* Abrams
(2) *C. linariaefolia* Benth.
(3) *C. coccinea* (L.) Spreng., scarlet paintbrush.
(4) Other species.

Mostly perennial herbs, sometimes root parasitic: Numerous in the Rocky Mountain and Pacific Coast States (1,2,4) and one species common eastward (3); showy-flowered plants, sometimes transplanted to gardens; useful to wildlife.

Cercospora sp., leaf spot. Alaska (4).
Cronartium coleosporioides Diet. & Holw. (II,III), rust. Calif. (1); Colo., N.Mex., Utah, Wyo. (2); S.Dak. to Mex., Calif., and Wash. (4). O and I on 2- and 3-needle *Pinus* spp.
Erysiphe polygoni DC., powdery mildew. Colo., Wash. (4).
Mycosphaerella sp. (*Sphaerella vagans* Ell. & Ev.), on stems. Colo. (4).
Puccinia andropogonis Schw. var. *micropuncta* (Ell. & Ev.) Arth. (O,I), rust. Iowa (3); Wis. to N.Mex., Calif., and Mont. (4). II and III on *Andropogon* spp.
P. castillejae (Diet. & Holw.) Arth. (II,III), rust. Calif., Utah (4). O and I unknown.
Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Colo., Wash., Wis. (4).

Chelone, turtlehead

(1) *C. glabra* L.
(2) Other species.

Perennial herbs, mostly in the Eastern and Southeastern States, sometimes grown for ornament and useful to wildlife.

Erysiphe spp., powdery mildew. Reported as *E. galeopsidis* DC. (=*E.* ?*cichoracearum* DC.) in Del., Mich., Miss., N.Y., Ohio, Pa., Wis. (1); N.C. (2); as *E. cichoracearum* in Ind., Mass. (1); as *E. polygoni* DC. in Mass., Mich., N.Y., Pa. (1).
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.)—Reported in Ohio (1) but doubtful.
Puccinia andropogonis Schw. var. *pentstemonis* (Schw.) Arth. (O,I), rust. Conn., Mass., N.J., N.Y., Pa. (1); Tenn. (2). II and III on *Andropogon* spp.
P. chelonis Diet. & Holw. (III), rust. Oreg., Wash. (2).
Septoria mariae-wilsonii G.W.Clinton, leaf spot. Maine to Pa., Ohio, and Wis. (1).

Collinsia

(1) *C. grandiflora* Dougl., bluelips.
(2) *C. verna* Nutt., blue-eyed-mary.
(3) Other species.

Annual herbs, mostly in the Far West, but (1) in the Eastern and Central States; grown for ornament and useful to wildlife.

Aecidium insulum Arth. (O,I), rust. Utah (3).
Entyloma collinsiae Harkn., white smut. Oreg. (1), Calif. (3).
Puccinia collinsiae (Ell. & Ev.) P.Henn. (O,I,II,III), rust. Calif., Oreg., Utah, Wash. (3).
Pythium mamillatum Meurs, root rot. Calif. (3).
Septoria collinsiae H.W.Anderson, leaf spot. Ill. (2).

Digitalis

(1) *D. purpurea* L., foxglove.
(2) Other species.

Biennial, sometimes perennial, herbs of Europe; widely grown for ornament; also the source of the drug, digitalis.

Alternaria sp., leaf and inflorescence blight. On *D. lanata* Ehrh. in Md.
Cladosporium sp., leaf spot. N.J. (1).
Colletotrichum fuscum Laub., anthracnose. Oreg. (1), Pa. (1,2), Conn. (2); Mass. Differs from *C. antirrhini* F.C.Stewart; *C. digitalis* (E.Rostr.) Moesz probably a synomym.
Ditylenchus dipsaci (Kuehn) Filip., stem and leaf nematode. Conn. (1).
Fusarium sp., wilt, root rot. Calif. (1), N.H. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Calif. (1), Md.
Phyllosticta digitalis Bellynck, leaf spot. Alaska (1), N.Y. (2), Tex.
Ramularia variabilis Fckl., leaf spot. Oreg. (1).
Rhizoctonia solani Kuehn, root and stem rot. N.J. (1).
Sclerotinia sclerotiorum (Lib.) d By., stem rot, wilt. N.Y. (1).
Sclerotium rolfsii Sacc. (*S. delphinii* Welch), stem rot. Ind., N.J., Tex. (1,2).
Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (1).

Hebe

Hebe spp., such as *H. elliptica* (Forst. f.) Pennell and *H. speciosa* (R. Cunn.) Cockayne & Allan.

Evergreen shrubs of New Zealand, grown for ornament chiefly in California.

Septoria exotica Speg., leaf spot. Calif.

Leucophyllum

L. frutescens (Berl.) Johnston, cenizo.

Spreading, pubescent shrub of Texas and New Mexico.

Nectria sp., canker. Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Volutella ?*gilva* Pers. ex Sacc.—Tex.

Linaria, toadflax

(1) *L. canadensis* (L.) Dumort., blue toadflax.
(2) *L. vulgaris* Mill., butter-and-eggs.
(3) Other species.

Annual or biennial herbs: (1) native in North America; (2) a European species but widely naturalized, sometimes a weed; both useful to wildlife; (3) mostly of southern Europe, grown for ornament.

Aecidium sp. (O,I), rust. Wis. (1).
Alternaria sp., leaf spot. Mich. (2).
Botrytis cinerea Pers. ex Fr., gray mold. Alaska (3).

Colletotrichum vermicularioides Halst., anthracnose. Mass., N.J., N.Y., Tex., Wis. (2).
Ditylenchus dipsaci (Kuehn) Filip., stem and leaf nematode. N.Y. (1,2).
Entyloma linariae Schroet., white smut. Conn., N.J., Pa. (2).
Erysiphe cichoracearum DC., powdery mildew. Calif. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Heterosphaeria linariae (Rab.) Rehm (*Heteropatella lacera* Fckl.), on stems. N.Y. (2).
Meloidogyne spp., root knot nematodes. On (1,3).
Peronospora linariae Fckl., downy mildew. Fla., Mass., Okla., Wis. Also reported as *P. canadensis* Gäum. in Mass.
Phoma linariae Dearn. & House, on stems. N.Y., Tex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,3).
Puccinia antirrhini Diet. & Holw. (II,III), rust. Calif. (3).
Rhizoctonia solani Kuehn, root rot. Ill. (3).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Ariz. (3).
Sclerotium rolfsii Sacc., southern blight. Tex. (2).
Septoria linariae H.C.Greene, leaf spot. Wis. (1).
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Conn. (1).
YELLOWS—western aster yellows virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (1,3).

Maurandya

M. antirrhiniflora Humb. & Bonpl.

Perennial climbing herb of Mexico, grown for ornament and naturalized in the Southwest.

Septoria antirrhinorum Tharp, leaf spot. Tex.

Mimulus, monkeyflower

(1) *M. alatus* Soland.
(2) *M. luteus* L.
(3) *M. ringens* L., Allegheny monkeyflower.
(4) Other species.

Annual or perennial herbs and small evergreen shrubs, native in North America (1,3) or introduced (2). Several of the native species and (2) are cultivated as garden ornamentals; (2) also cultivated under glass; useful to wildlife.

Botrytis cinerea Pers. ex Fr., gray mold. Alaska (2).
Cercospora mimuli Ell. & Ev., leaf spot. Mo. (1).
Erysiphe cichoracearum DC., powdery mildew. Utah (2); Calif., Pa., and widespread (4).
Melanomma dothideasporum (Cke. & Harkn.) Sacc., on dead stems. Calif. (4).
Metasphaeria anisometra (Cke. & Harkn.) Sacc., on dead stems. Calif. (4).
Puccinia andropogonis Schw. var. *pentstemonis* (Schw.) Arth. (O,I), rust. Mo., Wis. (4). II and III on *Andropogon* sp. Not listed on *Mimulus* in Arthur.
Ramularia mimuli Ell. & Kell., leaf spot. Calif. (2); N.Y. (3); Ohio, Wyo. (4).
Rhabdospora kellermani Ell. & G.Martin, on leaves. Ohio (3).
Septoria mimuli Ell. & Kell., leaf spot. Ill., Ind., Miss. (1); Pa. to Mo., Nebr., and N.Dak. (3); Pa. to Miss., Kans., and N.Dak. (4).
Uredo sp. (II), rust. Wis. (3).
YELLOWS—western aster yellows virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (4).

Orthocarpus

Orthocarpus spp., owlclover.

Mostly annual herbs of the Far West, sometimes grown in wild gardens.

Ascochyta garettiana Syd., leaf spot. Oreg., Utah.
Cronartium coleosporioides (Diet. & Holw.) Arth. (II, III), rust. Colo., Idaho, Utah. O and I on *Pinus* spp.

Paulownia

P. tomentosa (Thunb.) Steud., paulownia, princesstree.

A tree of China, cultivated for ornament in zone 5; also locally naturalized in the Eastern States from New York to Georgia.

Ascochyta paulowniae Sacc. & Brun., leaf spot. Md.
Phomopsis (*Phoma*) *imperialis* (Sacc. & Roum.) Grove, on twigs. N.Y.
Phyllosticta paulowniae Sacc., leaf spot. Ala., Md., N.Y., Okla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. Md.
Polyporus spraguei Berk. & Curt., wood rot. Ala.
P. versicolor L. ex. Fr.—Md.

Penstemon, beard-tongue

(1) *P. barbatus* (Cav.) Roth
(2) *P. cobaea* Nutt.
(3) *P. confertus* Dougl.
(4) *P. gracilis* Nutt.
(5) *P. grandiflorus* Nutt.
(6) *P. hirsutus* (L.) Willd.
(7) *P. spectabilis* Thurb.
(8) Other species.

Many perennial herbs of prairies, plains, and alpine meadows, widely distributed but most numerous in the Far West; many are of ornamental value and some are used in rock and wild gardens.

Ascochytella pentstemonis Jenkins, stem spot. Calif. (7).
Cercospora pentstemonis Ell. & Kell., leaf spot. Kans., Okla., Tex. (2); Mont. (4); Kans., N.Dak., Nebr., S.Dak., Wis. (5); Ala. (6); Ind., Okla., Wis. (8).
Cercosporella nivosa Ell. & Ev., leaf spot. Colo., Idaho, Ohio, Wash. (8).
Coniothyrium pentstemonis Earle, on leaves and stems. Colo. (8).
Dimerium alpinum W.B.Cke., black crust on foliage. Calif. (8).
Erysiphe cichoracearum DC., powdery mildew. Wash. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Kellermannia alpina Ell. & Ev., on stems. Nev. (8)
Meloidogyne sp., root knot nematode. U.S., no place specified.
Mycosphaerella pentstemonis Earle, on leaves and stems. Colo. (8). *Sphaerella fuscata* Ell. is also reported there.
Phyllosticta antirrhini Syd., leaf spot. Ill. (6).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,8).
Puccinia andropogonis Schw. var. *pentstemonis* (Schw.) Arth. (O,I), rust. Kans. (2); Iowa, Mo., S.Dak., Wis. (4); Iowa, Kans., N.Dak., Nebr., S.Dak. (5);

Ala., Ga., Ill., Ind., Miss.. N.Y., Okla., Pa., Wis. (6); on (8) almost throughout the U.S. II and III on *Andropogon* spp.

Puccinia confraga Arth. & Cumm. (III), rust. Ariz. (8).

P. palmeri Diet. & Holw. (O,I,III), rust. Ariz., Calif., Idaho, Wash. (3); Mont. to N. Mex., Calif., and Wash. (8).

P. pentstemonis Pk. (III), rust. Utah (3); Ariz., Calif. (7,8); Oreg., Wyo. (8). Correlated with *P. andropogonis*, q. v.

Ramularia penstemonis W. B. Cke., leaf spot. Calif. (8).

Sclerotium rolfsii Sacc. (*S. delphinii* Welch), stem rot. Conn., N.J. (1); Tex. (2,8); Ill. (6); Mass., N.J. (8).

Septoria pentstemonis Ell. & Ev., leaf spot. Tex. (2,8); Wash. (3); Ill. (6); Calif., Maine, Mich., Miss., Mo., N.Y., Okla., Wis. (8).

S. pentstemonicola Ell. & Ev.—S. Dak., Wis. (4).

Sphaerella fuscata Ell.: See *Mycosphaerella pentstemonis.*

Scrophularia, figwort

(1) *S. californica* Cham. & Schlecht.
(2) *S. lanceolata* Pursh
(3) *S. marilandica* L., carpenters-square.

Coarse perennial herbs of wide distribution in the Eastern and Central States (2,3) or the Far West (1); (3) is sometime grown as a medicinal plant.

Cylindrosporium scrophulariae Sacc. & Ell., leaf spot. Ill., Okla., Pa. (3).

Coniothyrium scrophulariae (Fckl.) Sacc., on stems. Calif. (1).

Leptosphaeria consessa (Cke. & Ell.) Sacc., on stems. Calif., Oreg. (1).

Mycosphaerella sp. (*Sphaerella decidua* Ell. & Kell.), leaf spot. Kans. (3).

Peronospora sordida Berk. & Br., downy mildew. Calif. (1); Ill., Iowa, N.Y., Wis. (2); Va. to Kans., Nebr., and Wis. (3).

Septoria scrophulariae Pk., leaf spot. Calif., Oreg. (1); N.Y. to Miss., Colo., and Wash. (2,3).

Synthyris

(1) *S. reniformis* (Dougl.) Benth
(2) Other species.

Perennial herbs of the Rocky Mountain and Pacific Coast States, sometimes grown in wild gardens.

Puccinia acrophila Pk. (III), rust. Mont. to Colo. and Utah (2).

P. wulfeniae Diet. & Holw. (III), rust. Calif., Idaho, Oreg., Wash. (1); Idaho, Wash., Wyo. (2).

Ramularia sp., leaf spot. Oreg. (2).

Torenia

T. fournieri Lind.

Annual herb of China, often grown as a pot plant under glass or in the open in the Far South.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Md.

Verbascum, mullein

(1) *V. blattaria* L., moth mullein.
(2) *V. thapsus* L., common mullein.
(3) Other species.

Coarse perennial herbs of southern Europe and Asia: (1,2), especially (2), widely naturalized in the United States, (2) often a weed but both are useful to wildlife; (1,3) sometimes grown for ornament.

Cercospora verbascicola Ell. & Ev., leaf spot. Tex. (1,2); Ala., Del., Iowa, Md., Wis. (2).

Erysiphe cichoracearum DC., powdery mildew. Pa. (2).

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. ?Fla.

Mycosphaerella verbascicola (Schw.) Fairm., on leaves. Maine, N.C., N.Y., Pa. (2.)

Oidium sp., powdery mildew. N.J. (1).

Peronospora sordida Berk. & Br., downy mildew. N.J. (3).

Phoma spp., on stems. *P. thapsi* Ell. & Ev. reported in Tex. (1,2); N.J. (2); *P. verbascicarpa* Fairm. in N.Y. (1); *P. verbascicola* (Schw.) Cke. =*Mycosphaerella verbascicola*, q. v.

Phyllosticta verbascicola Ell. & Kell., leaf spot. Tex. (1,2); Ind., Kans., N.J., N.Y. (2); Wis. (2,3); N.Y. (3).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).

Ramularia variabilis Fckl., leaf spot. N.Y. to Miss., Tex., and Wash. (2); Conn. (3).

Septoria verbascicola Berk. & Curt., leaf spot. N.Y. to Ala., Tex., and Mo. (1).

Veronica, speedwell

(1) *V. arvensis* L., corn speedwell.
(2) *V. maritima* L.
(3) *V. officinalis* L., common speedwell, gypsyweed.
(4) *V. peregrina* L., neckweed, purslane speedwell.
(5) *V. serpyllifolia* L., thyme-leaved speedwell.
(6) *V. spicata* L.
(7) Other species.

Numerous annual or perennial herbs, mostly introduced but often widely naturalized and troublesome annual (1,4) or perennial (3,5) weeds in lawns and cultivated ground; some are wildlife-food plants; a few species (2,6) are grown for ornament. For evergreen shrubs sometimes referred to this genus, see *Hebe.*

Cercospora tortipes J.J.Davis, leaf spot. Wis. (7).

Entyloma veronicae (Wint.) Lagh., leaf smut. Tex. (1,3,7); Conn., Ill., Iowa, Kans., Miss., Mo., Tex., Wis. (4); Colo., N.Y. (7).

Fusarium sp., root and stem rot. N.J. (2,6).

Gloeosporium veronicae Dearn. & House, leaf spot. N.Y. (3).

Heterodera marioni (Cornu) Goodey. See *Meloidogyne* spp.

Meloidogyne spp., root knot nematodes. ?Fla. (4,7).

Peronospora grisea Ung., downy mildew. Ill., Ind., N.Y., Wis. (1); Ga., Ind., Kans., Wis. (4); Calif., Mo., Tex., Wis. (7). The form on (1) is also reported as *P. verna* Gäum.; on *V. anagallis-aquatica* L. as *P. aquatica* Gäum.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,3,4,7).

Puccinia albulensis Magn. (III), rust. Colo., Mont., Oreg., Utah, Wash., Wyo. (7).

P. probabilis Arth. & Cumm. (II,III), rust. N.Mex. (5). O and I are unknown.

P. rhaetica E.Fisch. (III), rust. Wash. (7).

P. veronicarum DC. (III), rust. Iowa (?5); Iowa, Wis. (7).

Ramularia veronicae Fckl., leaf spot. Tex. (1,3,7); Okla., Tex. (4); Wis. (4,5).

Rhizoctonia solani Kuehn, root and stem rot. Ill., Md. (5).

Sclerotium rolfsii Sacc. (*S. delphinii* Welch), stem rot. N.J. (3); Conn., Ohio (7).

Septoria veronicae Rob. ex Desm., leaf spot. Mich., Wis. (1); Calif., Fla., Iowa, Ohio, Wis. (7).

Sorosphaera veronicae Schroet., leaf and stem gall. Miss. (1), Colo. (7).

Sphaerotheca humuli (DC.) Burr. var. *humuli* (Schlecht.) Salm., powdery mildew. Conn., Oreg. (2); Wis. (5); Iowa (7).

Synchytrium globosum Schroet., leaf gall. La. (4).

Veronicastrum

V. virginicum (L.) Farwell, culversroot.

Perennial herb of the Eastern and Central States, sometimes grown in wild gardens.

Cercospora leptandrae J.J.Davis, leaf spot. Wis.
Erysiphe cichoracearum DC., powdery mildew. Ill.
Phyllosticta decidua Ell. & Kell., leaf spot. Tex., Wis.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia veronicarum DC. (III), rust. Iowa, Tex., Wis.
Ramularia veronicae Fckl., leaf spot. Tex.
Rhizoctonia solani Kuehn, root and stem rot. Tex.
Septoria veronicae Rob. ex Desm., leaf spot. Wis.
Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Conn., Ill., Iowa, Md., Mich., Mo., Wis.

SIMAROUBACEAE

Ailanthus

A. altissima (Mill.) Swingle, ailanthus, tree-of-heaven.

Deciduous tree, widely naturalized in range 1,2,3,5,6,8,11,17,20,22,24,25,27,28,29; sometimes cultivated for its handsome foliage.

Armillaria mellea Vahl ex Fr., mushroom root rot. N.Y.
Botryodiplodia ailanthi (Cke.) Sacc., on twigs. Ala., S.C., Tex.
Botryosphaeria ribis Gross. & Dug. var. *chromogena* Shear, N.E.Stevens, & M.S. Wilcox, on twigs. Ga., Md.
Camarosporium berkeleyanum (Lév.) Sacc., on twigs. N.Y.
Cercospora glandulosa Ell. & Kellerm., leaf spot. Widespread; Tex.
Colletotrichum tertium Grove, on twigs. S.C.
Coniothyrium insitivum Sacc. (*Cytoploea insitiva* (Sacc.) Petr.), on twigs. Cosmopolitan.
Cytospora ailanthi Berk. & Curt., on twigs. Kans.
Daedalea unicolor Fr., butt rot. Occasional.
Diaporthe medusaea Nits. (*Phomopsis ailanthi* (Sacc.) Trav.), on twigs. Del., N.J., N.Y., Ohio.
Dimerosporium robiniae Gerard, black mildew. D.C.
?*Diplodia ailanthi* Cke., twig blight. Tex.
D. natalensis P.Evans, twig blight. Tex.
Eutypella glandulosa (Cke.) Ell. & Ev., on branches. General.
E. microcarpa Ell. & Ev.—Ga.
Fusarium lateritium Nees, twig blight. Va. Conidial stage of *Gibberella baccata* (Wallr.) Sacc.
Gloeosporium ailanthi Dearn. & Barth., leaf spot. La., Tex., W.Va.
Guignardia ailanthi (Grove) Sacc., on twigs. S.C.
Haplosporella ailanthi Ell. & Ev., on dry twigs. Kans., N.Y.
Leptothyrium petiolorum (Cke. & Ell.) Sacc., on petioles. N.J., Ohio.
Mycosphaerella ailanthi Ell. & Barth., on twigs. N.Y.
Nectria cinnabarina Tode ex Fr., dieback, canker. Kans., N.J., S.C.
N. coccinea Pers. ex Fr. (*Cylindrocarpon candidum* Lk. ex. Wr.), trunk canker. Occasional.
Phoma ailanthi Sacc., stem blight. Tex.
Phyllosticta ailanthi Sacc., leaf spot. Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Physalospora obtusa (Schw.) Cke. (*Sphaeropsis ailanthi* Ell. & Barth.), on twigs and branches. Kans., Mich., N.Y.
Polyporus lacteus Fr. and *P. versicolor* L. ex Fr., wound rot, occasionally on living trees.
Schizophyllum commune Fr., wound rot. Kans., Mo., N.Y.
Trametes malicola Berk. & Curt.
Tubercularia ailanthi Cke. (=*T. vulgaris* Tode ex Fr.). See *Nectria cinnabarina*.
Verticillium albo-atrum Reinke & Berth., wilt. N.Y., Pa., Va.

Picramnia

P. pentrandra Sw., bitterbush.

Shrub or small tree of southern Florida and the West Indies.

Phyllachora domingensis Chardon, black leaf spot. P.R.

Simarouba

Simarouba spp.

Small, evergreen trees of southern Florida and the West Indies, sometimes grown for ornament.

Irenina glabroides F.L.Stevens, black mildew. P.R.

SOLANACEAE

Atropa

A. belladonna L., belladonna.

Perennial herb of Europe and Asia, cultivated for the drug atropine.

Alternaria sp. (?*A. solani* (Ell. & G.Martin) Sor.), leaf spot. Calif.
Cercospora atropae Kvashnina, leaf spot. Va.
Fusarium sp., root rot. Calif.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif.
Mycosphaerella sp., leaf spot. Calif.
Peronospora ?hyoscyami d By., downy mildew. Calif.
Phytophthora parasitica Dast., root rot. Calif.
Pseudomonas solanacearum E.F.Sm., bacterial wilt. ?Calif., Ga.
Pythium spp., damping-off, root rot. Calif. Species identified include: *P. debaryanum* Hesse, *P. irregulare* Buis., and *P. ultimum* Trow.
Ramularia sp., leaf spot. Calif.
Rhizoctonia solani Kuehn, damping-off, root rot. Calif.
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Calif.
Verticillium albo-atrum Reinke & Berth., wilt. Calif.

Xanthomonas solanacearum (E.F.Sm.) Dows.: See *Pseudomonas solanacearum* E.F.Sm.

Mosaic—undetermined virus. Calif., Fla. Susceptibility to infection by cucumber mosaic virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.) has been demonstrated.

Psyllid yellows—poisoning through feeding injury by the insect *Paratrioza cockerelli* (Sulc.). Calif.

Browallia

Browallia spp., especially *B. americana* L. (*B. demissa* L.) and *B. speciosa* Hook.

Annual herbs of tropical America grown in greenhouses and gardens for ornament.

Fusarium sp., wilt. Del.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Md.

Spotted wilt—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif.

Capsicum

C. frutescens L. (*C. annuum* L.), redpepper, sweet pepper.

Tropical shrub, grown usually as an annual for its edible fruit, cultivated in various horticultural forms such as var. *grossum* Sendt., sweet or bell pepper; var. *longum* Sendt., long pepper, chilli, cayenne; commercial cultivation chiefly in N.J., N.C., Fla., La., Tex., and Calif.

Alternaria sp., in part probably *A. solani* (Ell. & G.Martin) Sor., black rot of fruit, internal mold, leaf spot (early blight). General, often following sunscald and blossom-end rot. Possibly *A. capsici-annui* Savul. & Sandu, identified as the cause of a yellowish to blackish-gray leaf spot in Rumania. Other *Alternaria* spp., especially *A. tenuis* Auct., may be present, perhaps as secondary invaders; *A. tenuis* also causes seed mold.

Aphanomyces sp., seedling root rot. N.J.

Ascochyta capsici Bond.-Mont., leaf spot. Wash.

Bacterium vesicatorium Doidge: See *Xanthomonas vesicatoria.*

Botrytis cinerea Pers. ex Fr., gray-mold rot. Occasional in markets, especially after cold storage. Fruit rot and stem canker in the field is reported from Calif., Conn., N.J., Pa., Wash.

Cercospora capsici Heald & Wolf, frogeye leaf spot, stem-end rot of fruit. N.Y. to Fla., Tex., and Mo.; Calif., P.R.

Choanephora cucurbitarum (Berk. & Rav.) Thaxt., blossom rot. Fla., N.C.

Cladosporium herbarum Lk. ex Fr., velvet mold of fruit, secondary leaf spot. Calif., Ga., Tex., Wash., P.R.

Colletotrichum capsici (Syd.) Butl. & Bisby, ?anthracnose. Ga., Tex., P.R. According to Ramakrishnan, *C. capsici* includes *C. indicum* Dast. and *C. curcumae* (Syd.) Butl. & Bisby. Butler describes the disease as "anthracnose," chiefly on stems, sometimes on fruit. He attributes "ripe rot" to *Gloeosporium piperatum*, q. v., which is often referred to *Glomerella cingulata.*

C. nigrum Ell. & Halst., fruit rot. Fla., Ga., N.J., Tex., probably general in the East and South. Has been confused with *Gloeosporium piperatum*, q. v., sometimes regarded as a synonym, and reported as the cause of common anthracnose. The preponderance of evidence indicates it to be distinct and not the primary cause of anthracnose. This and other *Colletotrichum* spp. approaching *C. dematium* (Fr.) Grove occur as wound parasites or saprophytes on pepper pods.

Curvularia lunata (Wakk.) Boed., pod rot. Fla. Also on seed in Mich.

Cuscuta sp., dodder. Ga., N.J., Va.

C. pentagona Engelm. (*C. arvensis* Beyr.)—Tex.

Diaporthe phaseolorum (Cke. & Ell.) Sacc., fruit rot. Miss., Mo. Also reported as *Phomopsis capsici* (Magnaghi) Sacc.

Erwinia aroideae (Towns.) Holland and *E. carotovora* (L.R.Jones) Holland, bacterial soft rot. Conn., Fla., La., Mich., Mo., Tex.; occasional in markets.

Fusarium spp., fruit rot, stem rot, wilt. Reported in various aspects, especially as blight or wilt, from all pepper-growing districts, usually without specific identification.

F. annuum Leonian (?*F. vasinfectum* Atk. =*F. oxysporum* Schlecht. f. *vasinfectum* (Atk.) Snyd. & Hans.) is reported as causing wilt in Ariz., Colo., La., Md., Miss., N.J., N.Mex., Okla., and Tex.

Gloeosporium piperatum Ell. & Ev., anthracnose, fruit spot and rot, sometimes leaf and stem spot. Mass. to Fla., Tex., and Ill.; P.R. Often referred to *Glomerella cingulata* as a conidial stage but regarded by some as distinct; perhaps only a nonperithecial race.

Glomerella cingulata (Ston.) Spauld. & Schrenk, fruit rot, anthracnose. Conn. to Fla., Tex., and Kans.; P.R. Also reported as *G. piperata* (Ston.) Spauld. & Schrenk, which is doubtfully distinct.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot of stems, fruit rot. Calif., Ga., Kans., N.J., Tex.

Macrosporium: See *Alternaria* and *Stemphylium.*

Meliola capsicola F.L.Stevens, black mildew. P.R.

Meloidogyne spp., root knot nematodes. General in the South from N.J. to Fla., Tex., and Calif.; also N.Y. and Pa.

Nematospora coryli Pegl., pod spot (?secondary). Fla. Associated with plant-bug injury.

Penicillium spp., internal mold of fruit. Ga.

Peronospora tabacina Adam, downy mildew. Fla., Ga., N.C., S.C., Tex. Occurs chiefly in seedbeds.

Phoma destructiva Plowr., Phoma rot of fruit. Ala., Del., Fla., Ga., Miss., N.Y., Pa., S.C.

Phomopsis capsici (Magnaghi) Sacc.: See *Diaporthe phaseolorum.*

Phyllosticta sp. (?*capsici* Speg.), leaf spot. Ala., Del., Ga., N.J., Va., W.Va.

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.

Phytophthora capsici Leonian, Phytophthora blight, fruit rot. Calif., Colo., Fla., La., Mo., N.Mex., N.Y., Ohio, Tex., Va., P.R. Perhaps also in Ind., N.J., reported as *P. parasitica.*

P. parasitica Dast., fruit. rot. Ill., Ind.; perhaps also N.J. and N.Y., reported as *Phytophthora* sp.

Pythium spp., damping-off. Cosmopolitan. Usually reported as *P. debaryanum* Hesse (probably in part *P. ultimum* Trow) in Conn., La., Mass., N.C., N.J., N.Y., P.R.; also causing fruit rot. *P. aphanidermatum* (Edson) Fitzp. and *P. ultimum* also reported in Calif.

P. vexans d By., root rot. Md., Va.

Rhizoctonia solani Kuehn, damping-off, stem and root rot, soil rot of fruit. Cosmopolitan.

Rhizopus sp. (?*stolonifer* (Ehr. ex Fr.) Lind), black-mold rot of fruit. Fla., Tex., Wash. Occasional in markets.

Sclerotinia sclerotiorum (Lib.) d By., stem rot, pink-joint, fruit rot. Calif., Conn., Fla., Mass., Tex.

Sclerotium rolfsii Sacc., southern blight. N.C. to Fla. and Tex.; P.R.

Stemphylium botryosum Wallr., seed mold, secondary leaf spot. Conn., Fla.

S. solani Weber, gray leaf spot. Fla.
Verticillium albo-atrum Reinke & Berth., wilt. Calif., Colo., Conn., N.Y., Tex., and ?La.
Xanthomonas vesicatoria (Doidge) Dows., bacterial spot of fruit, stem, leaf; seedling blight. General in the South and East; also Ill., Ind., Mass., Mich., Nebr., N.Y., and Wis.

BIG BUD—?virus. N.Mex.
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Ariz., Calif., Idaho, N.Mex., Oreg., Tex., Wash.
MOSAIC—virus(es). General. In part cucumber mosaic virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.), various strains, reported especially in Calif., Fla., Ga., Md., Tex., T.H.; in part tobacco mosaic virus (*Marmor tabaci* Holmes var. *vulgare* Holmes, Nicotiana virus 1 K.M.Sm.) reported in Calif., Ill., Ind., Iowa, Md., N.J., N.Y., Okla., Pa., Tex., T.H. Infection of peppers by a yellow strain of this virus is reported in Oreg.

A mosaic disease caused by tobacco etch virus (*Marmor erodens* Holmes, Nicotiana virus 7 K.M. Sm.) is reported in N.J. and N.Y.; in Mass. (as ring spot).

A calico mosaic disease, perhaps caused by potato calico virus (*Marmor medicaginis* Holmes var. *solani* Black & Price, Solanum virus 10 K.M.Sm.) is reported in Ga.
RING SPOT—unidentified virus. Colo., Del., Md., N.J., N.Y. Susceptibility to artificial inoculation with potato mottle or ring spot virus (*Annulus dubius* Holmes, Solanum virus 1 K.M.Sm.), and also tomato ring spot virus (*Annulus zonatus* Holmes, Nicotiana virus 13 K.M.Sm.), has been demonstrated.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Colo., N.Y., Pa., W.Va., T.H.
STREAK—?virus (not identified). Tex.

BLOSSOM-END ROT—physiological, attributed to deficient water absorption and excessive transpiration. Chiefly in Southern and Eastern States, occasional in the Southwest.
SUNSCALD—injury to fruit by thermal and actinic radiation, often following defoliation by leaf diseases. General, especially on bell peppers.

Cestrum

Cestrum spp.

Shrubs and small trees of tropical America; cultivated as ornamentals in the Far South for their attractive and fragrant flowers.

Asterina coriacella Speg. and *A. solanicola* Berk. & Curt., on leaves. P.R.
Aulographum cestri Ryan, on leaves (associated with *Scolecopeltis*). P.R.
Cephaleuros virescens Kunze, algal spot. P.R.
Cladosporium sp.—Tex.
Meliola cestri Tehon and *M. gesneriae* F.L.Stevens, black mildew. P.R.
Phomopsis cestri Syd.—P.R.
Puccinia cestri Diet. & P. Henn. (O,III), rust. C.Z., P.R., V.I.
Scolecopeltis cestri Toro, on leaves. P.R.
Uromyces cestri (Mont.) Lév. (I,III), rust. Fla., P.R., V.I.

Cyphomandra

C. betacea (Cav.) Sendt., tree-tomato.

Woody shrub of South America, grown in warm regions for its edible fruit and sometimes in greenhouses for ornament or novelty.

Corynebacterium michiganense (E.F.Sm.) H.L.Jens., bacterial canker. Calif.
Oidium sp., powdery mildew. Md.

Datura

(1) *D. metel* L., Hindu datura.
(2) *D. meteloides* DC., sacred datura.
(3) *D. stramonium* L., Jimson-weed; including records for *D. stramonium.* f. *inermis* (Juss.) Hupka and var. *tatula* (L.) Torr.

Coarse perennial or annual herbs. One (2) in southwestern States, used commercially by Indians primarily for its narcotic properties; a wildlife-food plant. Some (1,3) are cosmopolitan tropical herbs: (1) sometimes grown for ornament and the most frequent garden datura; (3) naturalized throughout the United States, a useful indicator plant in virus research. All species contain atropine and similar alkaloids.

Alternaria crassa (Sacc.) Rands, leaf spot, pod blight. Fla., Wis. (1); Okla., Tex. (2); Vt. to Ill., Iowa, Tex., and Wis., ?P.R. (3).
A. solani (Ell. & G.Martin) Sor., ?leaf spot. Ill. (3). Often confused with the preceding and in some tests found incapable of infecting this host. However, apparently authentic reports also have been made.
Cercospora daturae Pk., leaf spot. Ill. (?3).
C. daturicola (Speg.) Ray, leaf spot. Okla. (3).
Diplodia atro-caerulea Ell. & Ev., on leaves and stems. Ala., Tex. (3).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H. (3).
Phomosis venenosa (Sacc.) Trav. & Spessa, on stems. N.Y., Pa., S.C. (3). Also reported as *P. daturae* (Rolland & Fautr.) Sacc.
Phyllosticta hortorum Speg., leaf spot. W.Va. (3). The name *Ascochyta hortorum* (Speg.) C.O.Sm. is doubtfully applicable.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2,3).
Physalospora rhodina (Berk. & Curt.) Cke., on stems. Ala.
Pseudomonas solanacearum E.F.Sm., bacterial wilt. Ga. (3).
Puccina aristidae Tracy (O,I), rust. Ariz. (2).
Rhizoctonia solani Kuehn, root and stem rot. N.Y., Va., Wis.
Sclerotium rolfsii Sacc., southern blight. Fla. (1,3).
Septoria lycopersici Speg., leaf spot. Md., Tex., Va., (3).
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Wis. (1,3).
Xanthomonas solanacearum (E.F.Sm.) Dows. SEE *Pseudomonas solanacearum.*

DELPHINIUM RING SPOT—virus (*Annulus delphinii* Holmes.). Calif. (experimental).
LEAF ROLL—virus (*Corium solani* Holmes, Solanum virus 14 K.M.Sm.). Natural infection of (3) in Oreg., apparently spread by aphids from potato; return inoculation to potato accomplished.
MOSAIC—virus(es). Fla., Ind., Iowa, N.Y., Wis. The following viruses have been shown to cause systemic infection in (3): alfalfa mosaic (*Marmor medicaginis* Holmes, Medicago virus 1 K.M.Sm.) including the potato calico strain (*M. medicaginis* var. *solani* Black & Price, Solanum virus 10 K.M.Sm.); cucumber mosaic (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.); potato mottle (*Annulus dubius* Holmes, Solanum virus 1 K.M. Sm.); also natural infection with the mottle virus reported in Oreg. on (3); tobacco etch (*M. erodens*

Holmes, Nicotiana virus 7 K.M.Sm.); tobacco streak (*Annulus orae* Holmes, *Tractus orae* (Holmes) Valleau, Nicotiana virus 8 K.M.Sm.).

RING SPOT—tomato ring spot virus (*Annulus zonatus* Holmes, Nicotiana virus 13 K.M.Sm.). Ind.

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Tex. (1,3).

YELLOWS—western aster yellows virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (3).

Hyoscyamus

H. niger L., henbane.

Annual or biennial herb of Europe, naturalized in waste ground in the Eastern and Central States; sometimes grown as a drug plant, its flowering tops used medicinally; furnishes food for wildlife.

Alternaria solani (Ell. & G.Martin) Sor., leaf spot. Wis.

Pseudomonas solanacearum E.F.Sm., bacterial wilt. Ga.

Xanthomonas solanacearum (E.F.Sm.) Dows. SEE *Pseudomonas solanacearum.*

MOSAIC—virus (*Marmor tabaci* Holmes, Nicotiana virus 1 K.M.Sm.). Va.

Lycium

I. Native Species

(1) *Lycium andersonii* Gray
(2) *L. californicum* Nutt.
(3) *L. carolinianum* Walt., Christmas-berry.
(4) *L. pallidum* Miers, desertthorn.

Low shrubs, partly evergreen, typically in dry, saline soils: (1,2,4) in the southwestern States, (3) in the Gulf States; some species are of minor forage value, all furnish food for wildlife.

Aecidium lycii Arth. (O,I), rust. Ariz. (4).

Cercospora lycii Ell. & Halst., leaf spot. Okla. (4).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3).

Puccinia globosipes Pk. (II,III), rust. Ariz. Calif., Nev., N.Mex., Utah (1,2); N.Mex. (species not designated). O and I unknown.

P. tumidipes Pk. (II,III), rust. Tex. (3,4); Ariz., Colo., N.Mex., Okla., Utah (4).

II. Introduced Species

(1) *Lycium barbarum* L.
(2) *L. chinense* Mill.
(3) *L. halimifolium* Mill., matrimony-vine.

Recumbent or vinelike shrubs of Africa, Asia, or Europe, sometimes grown for ornament; (3) widely naturalized in the United States.

Alternaria sp. (?*tenuis* Auct.), leaf spot. Iowa (3).

Cercospora lycii Ell. & Halst., leaf spot. Iowa (1,3).

Erysiphe polygoni DC., powdery mildew. Minn. (2); Conn., Del., Md., N.J., Pa. (3).

Microsphaera diffusa Cke. & Pk., powdery mildew. Ohio, Pa., Utah (3). Also reported as *M. lycii* (Lasch) Sacc. & Roum.=*M. mougeoti* Lév., not authenticated in the U.S. Unidentified powdery mildews (conidial stage) are reported also in Idaho, Md., and Wash. (3).

Phyllosticta lycii Ell. & Kell., leaf spot. Ohio (1,3), N.Y. (3).

Puccinia globosipes Pk. (II,III), rust. Pa. (3).

P. tumidipes Pk. (II,III), rust. Minn., S.Dak. (2); N.Y. to Ala., Tex., and S.Dak. (3). O and I produced on (3) in cultures.

Sphaeropsis lycii Dearn. & Barth., on stems. Mo. (3).

Sphaerotheca pannosa (Wallr.) Lév., powdery mildew. Idaho, Wash. (3).

Lycopersicon

(1) *L. esculentum* Mill., tomato.
(2) *L. esculentum* var. *cerasiforme* (Dun.) A. Gray, cherry tomato.
(3) *L. esculentum* f. *pyriforme* (Dun.) C. H. Mull. (var. *pyriforme* (Dun.) Bailey), pear tomato.
(4) *L. pimpinellifolium* (Jusl.) Mill., currant tomato.

L. esculentum, a perennial herbaceous cultigen of western South America, grown as an annual and cultivated for fresh fruit throughout the United States in gardens and commercially in Texas, Florida, and other Gulf States, also California; cultivated for canning and processing chiefly in California, New Jersey, New York, Tennessee, Missouri, Indiana, Michigan, Maryland, Ohio, Illinois, Arkansas, Colorado; (2) and (3) are cultivated usually for preserves; (4) is sometimes grown for ornament. All records pertain to the common tomato unless otherwise indicated.

Agrobacterium rhizogenes (Riker et al.) Conn, hairy root and *A. tumefaciens* (E.F.Sm. & Town.) Conn, crown gall. Natural infection of field-grown plants apparently not recorded, but the tomato is commonly used as an experimental host, especially for crown gall.

Alternaria sp., commonly reported as *A. fasciculata* (Cke. & Ell.) Jones & Grout (probably =*A. tenuis* Auct.), black mold, Alternaria rot of fruit usually after blossom-end rot, secondary leaf spot. Cosmopolitan.

A. solani (Ell. & G.Martin) Sor., collar rot (in part), early blight, Alternaria rot of fruit. General (1,2, 3,4), especially in leaf and fruit phases; collar rot phase most frequent in the Southern States and northward to N.Y. and Ill. An arrested state of fruit spot identified as caused by *A. solani* is reported from Ind.

A. tomato (Cke.) Brinkman (*A. tomato* (Cke.) Weber), nailhead spot of fruit and stems. Conn. to Fla., Tex., and N.Dak. (1). Much confused with *A. solani* and *A. tenuis*. This name, although probably first applied to *A. tenuis* material, must under the Code of Botanical Nomenclature be applied to the nailhead organism.

Aphanomyces cladogamus Drechs., rootlet necrosis (in greenhouse). Va. (1).

Aplanobacter michiganense E.F.Sm.: SEE *Corynebacterium michiganense.*

Ascochyta lycopersici (Plowr.) Brun., leaf spot. Del., Fla., N.C., N.J., Oreg., Va., Wis., P.R. (1). In Europe this is usually referred to *Diplodina lycopersici* (Cke.) Hollós (conidial) or *Didymella lycopersici* Klebahn (ascigerous), and it has been related, perhaps doubtfully, to *Phoma destructiva* Plowr. Although reported on stems in the U.S., it does not cause a serious stem rot as in Europe.

Aspergillus spp., green and yellow mold, secondary fruit rot. Tex. (1). The following species identified: *A. flavus* Lk., *A. luteo-niger* (Lutz) Thom & Church, *A. nidulans* (Eidam) Wint., *A. ochraceus* Wilhelm, *A. tamartii* Kita, and *A. terreus* Thom.

Bacterium punctulans Bryan: See *Pseudomonas tomato.*
Botryosporium pulchrum Cda., leaf mold (greenhouse). Pa., Tex. (1).
Botrytis cinerea Pers. ex Fr., gray-mold rot of foliage and fruit, stem rot. Occasional in various localities, north and south, also in Calif.; usually after low-temperature injury (1,2).
Brachysporium tomato (Ell. & Barth.) Hiroë & Watanabe, fruit rot. Kans., Tex. (1).
Cercospora spp., leaf spot. Ala., Iowa, Kans., Mo., N.J., S.C., P.R., and Guam (1). Reported as *C. canescens* Ell. & G.Martin and *C. cruenta* Sacc., but doubtful; *C. diffusa* Ell. & Ev. and *C. physalidis* Ell. are recorded on tomato without localities specified.
C. nicotianae Ell. & Ev.—Tex.
Chaetomium bostrychodes Zopf, leaf and stem mold. Tex. (1).
Cladosporium fulvum Cke., including the so-called var. *violaceum* Plowr., leaf mold. General on greenhouse crop, occasional in garden and field crops, especially in the Eastern and Southern States (1,2,3). Stem-end rot of fruit attributed to *C. fulvum*, and also seed transmission, reported in Indiana.
C. herbarum Lk. ex Fr., green-mold rot. Occasional on greenhouse tomatoes and on field-grown fruit in transit and storage (Calif., Ind., Mass.), especially on green-picked fruit and on yellow varieties (1,2, 3).
Colletotrichum atramentarium (Berk. & Br.) Taub., secondary root and stem rot. Pa., Va. (1).
C. phomoides (Sacc.) Chester, anthracnose, chiefly a ripe rot of fruit, sometimes on leaves. General, most frequent in Northeastern and North Central tomato districts (1). *C. dematium* (Pers. ex Fr.) Grove is reported as a secondary fruit rot in Tex.
Corticium solani (Prill. & Del.) Bourd. & Galz.: See *Pellicularia filamentosa.*
Corynebacterium michiganense (E.F.Sm.) H.L.Jens., bacterial canker of fruit and stems, birds-eye spot of fruit. General; most frequent in the North and West, occasional in the South (1).
Cuscuta spp., dodder. Calif., Idaho, Md., N.Y., Tex. (1).
C. campestris Yuncker—Calif.
C. indecora Choisy—Tex.
Diaporthe phaseolorum (Cke. & Ell.) Sacc., fruit rot. Miss., Tex.
Diplodia theobromae (Pat.) Nowell, fruit rot (?secondary). Ala. (1).
Diplodina lycopersici (Cke.) Hollós: See *Ascochyta lycopersici.*
Erwinia aroideae (Towns.) Holland and *E. carotovora* (L.R.Jones) Holland, bacterial soft rot. Cosmopolitan in transit and markets, especially in green-packed fruit, occasional in fields (1).
?Erysiphe polygoni DC., powdery mildew. On seedlings in greenhouse. N.C. (1).
Fusarium oxysporum Schlecht. f. *lycopersici* Sacc. (*F. lycopersici* (Sacc.) Wr., *F. bulbigenum* Cke. & Mass. var. *lycopersici* (Brushi) Wr. & Reinking), Fusarium wilt. General (1,2,3). Fruit rot, wound or secondary, is sometimes attributed to this but is probably due to other forms of *F. oxysporum* and to other species, such as *F. avenaceum* (Fr.) Sacc., *F. equiseti* (Cda.) Sacc., *F. scirpi* Lambotte & Fautr. var. *acuminatum* (Ell. & Ev.) Wr. (all synonyms of *F. roseum* Lk. emend. Snyd. & Hans.), *F. moniliforme* Sheldon, *F. solani* (Mart.) Appel & Wr. Reported occasionally in transit and markets.
F. retusum Wellman, wilt. Ind. (1).
Glomerella cingulata (Ston.) Spauld. & Schrenk, fruit rot, ?leaf spot. Reported (in ?conidial stage) in Fla., La., Maine, Mich., N.J., N.Y. (1); perhaps without discrimination from *Colletotrichum phomoides.*
Helminthosporium sp., stem canker. Tex. (1).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Isaria clonostachoides Pritchard & Porte (*?Clonostachys araucaria* Cda. var. *rosea* Preuss), fruit rot. Va. (1).
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot of stems. Calif., Tex. (1).
Macrosporium: See *Alternaria, Pleospora, Stemphylium.*
Melanconium (on this host): See *Myrothecium.*
Melanospora interna Tehon & Stout, on stems. Ill. (1).
Meloidogyne spp., root knot nematodes. General in field culture in the South, including the Middle Atlantic and South Central States, occasional northward; also the Pacific coast (1,2,3,4).
Mycosphaerella sp., on leaves. S.C. (1).
Myrothecium sp., stem canker. Tex. (1).
M. roridum Tode ex Fr., ring rot of fruit. Ohio, Tex., Va., Wis. (1).
Nematospora coryli Pegl. (*N. lycopersici* Schneider), on fruit, associated with "cloudy spot." Calif., Fla., Ga. (1).
Nigrospora oryzae (Berk. & Br.) Petch., fruit rot. Calif. (1).
Oidium sp., powdery mildew. P.R. (1).
Olpidium brassicae (Wor.) Dang., on roots. Wis. (1).
Oospora lactis (Fres.) Sacc. f. *parasitica* Pritchard, sour rot, watery rot of fruit. Reported under this name from Ind., Md., Miss., Mo., N.J., Tex., Va. (1); but probably a cosmopolitan saprophyte; common in transit and markets on fruit from the South.
Orobanche ludoviciana Nutt., broomrape (parasitic on roots). Wyo. (1). *O. ramosa* L. in Calif., Ky., N.J. (1).
Pellicularia filamentosa (Pat.) Rogers (*Rhizoctonia solani* Kuehn), damping-off, collar rot, stem canker, soil rot of fruit. Cosmopolitan (1,2,3).
Peronospora tabacina Adam, downy mildew. Ga., N.C., S.C. (1).
Pestalotia sp., fruit rot. Tex. (1).
Phoma destructiva Plowr., Phoma rot of fruit, black spot of fruit, stems, and leaves. Nearly general, especially in the South, but not yet reported from the North Central States (1).
Phomopsis sp.: See *Diaporthe phaseolorum.*
Phyllosticta hortorum Speg. (*?Ascochyta lycopersici* Brun.), leaf spot. N.Y. (1). This has been referred to *Ascochyta* as *A. hortorum* (Speg.) C.O. Sm., but it has been questioned whether the American fungus conforms to *P. hortorum.*
P. lycopersici Pk.: See *Phoma destructiva.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Okla., Tex. (1,2,3).
Phytophthora cactorum (Leb. & Cohn) Schroet., stem rot, fruit rot, in part buckeye rot. N.Y., Pa., Wis. (1).
P. infestans (Mont.) d By., late blight, fruit rot. General in humid regions and seasons; most frequent in the East and Southeast, occasional in Central and Pacific States (1,2,3).
P. parasitica Dast. (*P. terrestris* Sherb.), buckeye rot of fruit, stem rot. Mass. to Fla., Tex., and Ill.; Ariz., Calif., P.R. (1). Other species causing a similar rot are: *P. capsici* Leonian in Calif. and Colo.; *P. cryptogaea* Pethybr. & Laf. in Ill. and N.H.; *P. drechsleri* Tucker in Calif.
Plectospira myriandra Drechs., rootlet necrosis. Md., Va. (1).
Pleospora lycopersici El. & Em. Marchal (=*?P. herbarum* (Pers. ex Fr.) Rab.), fruit rot. Calif. (1).
Pratylenchus pratensis (De Man) Filip., root necrosis. Md. (1).
Pseudomonas solanacearum E.F.Sm., bacterial wilt.

General in the Eastern, Central, and especially the Southern, States from Mass. to Ill., Colo., Ariz., and southward; T.H. (1).

P. tabaci (Wolf & Foster) F.L.Stevens, wildfire. Wis.

P. tomato (Okabe) Altstatt, bacterial speck. Occasional in Middle Atlantic, Southeastern, and Central States, also in Calif., Okla., Tex. (1).

Pullularia pullulans (d By.) Berkhout, fruit spot. W.Va. (1).

Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, secondary root rot. Iowa, Ill., N.J. (1).

Pythium spp., damping-off, collar rot, occasional fruit rot (soil rot). Cosmopolitan (1,2,3). Commonly reported as *P. debaryanum* Hesse, especially in the Northeastern and North Central districts and as *P. ultimum* Trow in Calif., Colo., Md., N.Y., Ohio. Also reported are the following:

P. aphanidermatum (Edson) Fitzp., damping-off. Okla.

P. megalacanthum d By., root rot. Calif.

P. myriotylum Drechs., rootlet rot. S.C.

P. oligandrum Drechs., root rot. Fla., Va.

P. salpingophorum Drechs.—Md.

P. vexans d By., root rot. Md., Va.

Rhizoctonia solani Kuehn: See *Pellicularia filamentosa.*

Rhizopus stolonifer (Ehr. ex Fr.) Lind (*R. nigricans* Ehr.), Rhizopus rot, ripe rot. Cosmopolitan in transit and markets; sometimes in fields (1). Also reported causing stem blight following fruit rot in Calif.

Rotylenchulus reniformis Linford & Oliviera, root nematode. Fla.

Sclerotinia sp., blossom blight. Calif., Fla., N.Y., Ohio (1).

S. minor Jagger, fruit rot. Tex. (1).

S. sclerotiorum (Lib.) d By., stem rot, fruit rot, "timber rot." Occasional in greenhouses, also in fields in the Southern States.

Sclerotium bataticola Taub.: See *Macrophomina phaseoli.*

Sclerotium rolfsii Sacc., southern blight. Va. to Fla., Tex., and Kans.; also Calif. and P.R.; occasionally in the Northern States (Ind., Md., N.J.) on southern-grown plants (1).

Septoria lycopersici Speg., leaf spot. General except the Pacific Northwest (1,2,3,4). Brentzel in North Dakota thinks that *Septoria linicola* (Speg.) Garassini may have caused a similar disease in that State.

Spongospora subterranea (Wallr.) Lagh., powdery scab, on roots. Pa. (1).

Sporotrichum sp., fruit rot. Ind., Tex. (1).

Stemphylium sp. (?*S. botryosum* Wallr.), leaf and fruit spot. Calif., Del., Ind., S.C. (1). See also *Pleospora lycopersici* of which this is probably the conidial stage.

S. solani Weber, gray leaf spot. Fla., Ga., Ind., La., N.C., N.J., S.C., Tenn., Tex., Va. (1).

Synchytrium endobioticum (Schilb.) Perc., wart. Pa. (1).

Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Tex. (1).

Trichothecium roseum Lk. ex Fr., fruit rot. Md., Ohio (1).

Verticillium albo-atrum Reinke & Berth., Verticillium wilt. Occasional in all regions, especially the Pacific and Northwestern States, sometimes in the North Central (Ill., Iowa, Ohio, Wis.), Southern (Fla., Miss., Tex.), and Western (Colo., Utah) States (1, 2,3). The form or species known as *V. dahliae* Klebahn is reported in Calif., Miss., and Ohio. Stem canker attributed to *V. albo-atrum* is reported in Calif.

V. lycopersici Pritchard & Porte, collar rot in seedbeds. Colo., Del., Ill., Md., N.J., S.C. (1). Probably a form of the preceding.

Xanthomonas solanacearum (E.F.Sm.) Dows.: See *Pseudomonas solanacearum.*

X. vesicatoria (Doidge) Dows., bacterial spot of fruit and leaves, sometimes stem cankers. Northeastern, Central, and Southern States; rare or absent in the West but reported from Kans., N.Dak., Nebr., Oreg., S.Dak., Tex. (1).

Big bud—virus (?*Galla australiensis* Holmes, Lycopersicon virus 5 K.M.Sm.; ?*Chlorogenus vaccinii* Holmes, Vaccinium virus 1 K.M.Sm.). Calif., N.Mex., Wash. (1); generally distributed in southern Calif. but low incidence in individual fields. These viruses may be identical or closely related strains; the latter has not been identified in natural infections of this host but is inoculable to tomato.

Bunch top—unidentified virus. Tex.

Bushy stunt—virus (*Marmor dodecahedron* Holmes, Lycopersicon virus 4 K.M.Sm.). Used in experiments in N.J., natural occurrence not reported.

Curly top (western yellow blight)—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M. Sm.). Western States from N.Dak. to Tex., Calif., and Wash. (1,2,3,4).

Dieback streak: See Tip blight and Spotted wilt.

Fern-leaf—virus. Typically caused by a distorting strain of tobacco mosaic virus (*Marmor tabaci* Holmes var. *deformans* Holmes, Nicotiana virus 1A K.M.Sm.). Occasional in greenhouses (1). Sometimes applied to a similar disease caused by cucumber mosaic virus, better known as shoestring, q. v.

Internal browning (of fruit)—?virus; attributed to the plantain strain of tobacco mosaic virus (*Marmor tabaci* Holmes var. *plantaginis* Holmes). N.J. Perhaps "vascular browning" in Fla.

Leaf roll—?virus. This disease, as ordinarily observed in tomato, is of physiological origin, but virus leaf roll is reported in Tex.; potato leaf roll virus (*Corium solani* Holmes, Solanum virus 14 K.M. Sm.) is communicable to tomato.

Mosaic—virus(es). Commonly tobacco mosaic virus (*Marmor tabaci* Holmes, Nicotiana virus 1 K.M. Sm.), less frequently cucumber mosaic virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.); sometimes both. General (1,2,3).

Some severe types of mosaic may be due to tobacco etch virus (*Marmor erodens* Holmes, Nicotiana virus 7 K.M.Sm.) reported in Fla. and Ky.

Yellow (aucuba) mosaic, caused by yellow strains of tobacco mosaic virus (*Marmor tabaci* Holmes var. *aucuba* Holmes, Nicotiana virus 1A K.M.Sm.) occurs on fruit and foliage, is less frequent than the typical form.

Mild types may be caused by the potato mottle virus (*Annulus dubius* Holmes, Solanum virus 1 K.M.Sm.), but natural infection with this virus is reported only in combination with other viruses, causing streak; the mottle virus alone has been reported in Wash.

A leaf-withering strain of this virus (*Marmor tabaci* Holmes var. *siccans* Doolittle & Beecher) is reported in Md. and Va.

Systemic infection of tomato from artificial inoculation has been demonstrated with the following viruses:

Celery calico (*Marmori aevi* Holmes, Apium virus 2 K.M.Sm.); Potato calico (*Marmor medicaginis* Holmes var. *solani* Black & Price, Solanum virus 10 K.M.Sm.);

Potato severe mosaic (veinbanding) (*Marmor upsilon* Holmes, Solanum virus 2 K.M.Sm.).

Natural infection with celery calico virus has been reported in Calif.

Ring spot—tomato ring spot virus (*Annulus zonatus* Holmes, Nicotiana virus 13 K.M.Sm.). Colo., Ind., Wyo., ?N.Y. (1). Serologically distinct from tobacco ring spot.

RUGOSE MOSAIC: See SPOT NECROSIS.

SHOESTRING (filiform leaf)—virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.). Occasional in fields in all sections (1).

SPOT NECROSIS, RUGOSE MOSAIC—viruses, potato mottle (*Annulus dubius* Holmes, Solanum virus 1 K.M. Sm.), and veinbanding (*Marmor upsilon* Holmes, Solanum virus 2 K.M.Sm.). Natural infection in greenhouse tomatoes in Wash.

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Pacific States and Colo., Idaho, Tex., Utah, T.H., in fields; occasional in Eastern and Central States (Ill., Mich., Miss., Mo., N.Y., Ohio, Pa., W.Va., Wis.) and Nebr., mostly in greenhouses (1). Tip blight, caused by a strain (*L. australiense* var. *lethale* Holmes) of this virus, is reported in Calif., Md., Oreg., Tex., Utah, W.Va. (1).

STREAK (winter blight)—virus(es). Double-virus or complex streak, caused by potato mottle or latent virus (*Annulus dubius* Holmes, Solanum virus 1 K.M.Sm., various strains), together with tobacco mosaic virus (*M. tabaci* Holmes, Nicotiana virus 1 K.M.Sm.) has been reported widely in greenhouses in the Eastern, Central, Pacific Coast, and occasionally the Southern States where potatoes or potato-virus-carrying weeds grow in proximity to tomatoes; field infections from contaminated greenhouse and volunteer plants also occur. Other tobacco viruses, such as etch (*M. erodens* Holmes, Nicotiana virus 7 K.M.Sm.), reported in Ky., may be a component of this complex. Single-virus streak, caused by a necrotic strain (*M. tabaci* var. *canadense* Holmes) of tobacco mosaic virus, occurs occasionally in greenhouses and is also reported in fields in Ind., Ky., Okla.

TIP BLIGHT: See SPOTTED WILT.

WESTERN YELLOW BLIGHT: See CURLY TOP.

WINTER BLIGHT: See STREAK.

WITCHES'-BROOM—unidentified virus (*?Chlorogenus solani* Holmes, Solanum virus 15 K.M.Sm.). Tex. (1).

YELLOWS—aster yellows virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Ill., Ind., Md., N.Y., Tex. (1).

BLOSSOM-END ROT—physiological, attributed to unbalanced moisture supply in relation to transpiration, perhaps also influenced by calcium deficiency. General (1,2,3,4).

BLOTCHY RIPENING—fruit defect attributed to malnutrition, perhaps potassium deficiency. Ind., Mich., N.Y., Tex., Wash. (1).

"BULL PLANT": See FASCIATION.

CATFACE—fruit abnormalities attributed to various unknown growth disturbances, in part climatic. Occasional anywhere (1).

CENTER, or CORE, ROT—internal necrosis of fruit of undetermined cause, but probably sometimes a phase of blossom-end rot; various organisms (bacteria and fungi, sometimes viruses) in association. Ind., Md., N.J., Oreg., Tex., Va. (1).

CLOUDY SPOT—fruit blemish attributed to feeding punctures by plant bugs. Del., Fla., Ind., Kans., Miss., N.Y., Ohio (1).

CUTICLE CRACK (of green fruits)—physiological, attributed to high soil moisture followed by high air temperatures. Tex.

FASCIATION—cause not determined, probably a genetic growth abnormality or sometimes excessive or unbalanced nutrition. "Bull plant," excessive vegetative vigor accompanied by barrenness, is probably a related abnormality. Both conditions occasional anywhere.

FRENCHING—physiological, perhaps nitrogen deficiency. Ky.

GHOST SPOT—fruit blemish of unknown cause. Occasional in greenhouses, and in fields in the Gulf, Central, and Eastern States; also Calif.

HOLLOW STEM (hollow-stem wilt)—cause not determined. Ind. Attributed to lightning injury in Ill. and Wis.; to fertilizer injury in Ark. and N.J.

LEAF ROLL (curl)—physiological, associated with excessive soil moisture and with starch congestion in leaves following heavy pruning. General (1).

OEDEMA—leaf hypertrophy induced by excessive water absorption and reduced transpiration. Occasional in greenhouses, sometimes in fields. See LEAF ROLL.

POCKETS (puffing)—fruit defect attributed to environmental or nutritional factors that adversely affect pollination and growth. Occasional in greenhouses; sometimes in fields, especially on the winter and early-spring crops in the Gulf States.

POX (pitting)—fruit blemish of unknown cause, chiefly on green-wrap fruit. Ala., Ark., Calif., Fla. ,Ill., Pa., Tex., Wis., P.R.

PSYLLID YELLOWS—toxemia induced by feeding of the insect *Paratrioza cockerelli* (Sulc). Ariz., Calif., Colo., Nebr., N.Mex., S.Dak., Tex., Utah, Wyo. (1).

RED RING—stem injury by the insect *Cyrtopeltis luridus* (Gibson) (*C. varians* (Dist.)) Ariz., S.C., Tex. (1).

RUSSETTING—leaf injury by mites (*Phyllocoptes destructor* Kiefer). Ariz., Colo., Tex. (1).

SUNSCALD—fruit injury by heat and actinic rays, especially on plants defoliated by disease. General (1).

TOP NECROSIS—deformity and necrosis of shoot apex induced by mites (*Tarsonemus* sp.). N.Y. (1).

VASCULAR BROWNING OF GREEN-WRAP FRUIT, "GRAY WALL"—Fla. May equal internal browning, q.v. under virus section, and center rot, q.v. this section, in Tex. Found in commercial tomatoes from Pa. and N.Y.

WALNUT WILT—toxemia induced by root excretions of walnut trees (*Juglans nigra* L.). Mich., N.J., Pa., Va. (1).

Nicandra

N. physalodes (L.) Gaertn., apple-of-Peru, shoofly plant.

Annual herb of Peru, grown for ornament in old gardens and sometimes escaped; chiefly in the East and South.

Cercospora physaloides Ell., leaf spot. Ind.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

MOSAIC—unidentified virus(es). Idaho, Iowa, Ky., Wash., Wis. Systemic infection by inoculation with the following viruses has been demonstrated:
- Cucumber mosaic (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.);
- Potato mottle (*Annulus dubius* Holmes, Solanum virus 1 K.M.Sm.);
- Potato veinbanding (*Marmor upsilon* Holmes, Solanum virus 2 K.M.Sm.);
- Tobacco etch (*Marmor erodens* Holmes, Nicotiana virus 7 K.M.Sm.);
- Tobacco mosaic (*Marmor tabaci* Holmes, Nicotiana virus 1 K.M.Sm.);
- Tobacco ring spot (*Annulus tabaci* Holmes, Nicotiana virus 12 K.M.Sm.);
- Tobacco streak (*Annulus orae* Holmes, Nicotiana virus 8 K.M.Sm.); and
- Tomato spotted wilt (*Lethum australiense* Holmes. Lycopersicon virus 3 K.M.Sm.).

Nicotiana

I. Introduced Species

(1) *Nicotiana alata* Link & Otto

(2) *Nicotiana glauca* Graham, tree tobacco.
(3) *N. longiflora* Cav.
(4) *N. sanderae* W. Wats. (*N. alata* × *N. forgetiana* Sander).
(5) *N. sylvestris* Speg. & Comes

Herbs of South America: (1,4,5) cultivated for ornament as annuals; (2) an arborescent, grown for novelty in borders and as specimens in the Far South, naturalized in California and Texas, the source of insecticidal alkaloid anabasine; (3) formerly grown in gardens and sometimes escaped in Texas and southward.

Alternaria longipes (Ell. & Ev.) Mason, leaf spot. Tex. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Fla. (1,2,4); ?Calif.
Oidium sp. (?*Erysiphe*), powdery mildew. Ky. (1).
Peronospora tabacina Adam, downy mildew. Calif., Tex. (2). Also experimental infection of (2,5).
Phomopsis nicotianae Fairm., on stems. Calif. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Tex. (3).
LEAF ROLL—unidentified virus. P.R. (3).
MOSAIC—virus (*Marmor tabaci* Holmes, Nicotiana virus 1 K.M.Sm.). Natural infection not reported but systemic infection results from artificial inoculation with green and yellow strains (*).
RING SPOT—tobacco virus (*Annulus tabaci* Holmes, Nicotiana virus 12 K.M.Sm.). Systemic infection from artificial inoculation (2,3,4,5).
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (2).
FRENCHING—physiological; ?toxic organic constituents of the soil. Ky. (1,3,4) (?experimental).

II. Miscellaneous Species

(1) *Nicotiana bigelovii* S. Wats., Indian-tobacco.
(2) *N. glutinosa* L.
(3) *N. repanda* Willd.
(4) *N. rustica* L., peasants tobacco, wild tobacco.
(5) *N. trigonophylla* Dunal, desert tobacco.

Annual herbs (4 sometimes perennial): (1,3,5) native of the Southwestern States, (1) chiefly in California, (3) in Texas, (5) from Texas to California; both (1) and (5) used by the Indians for smoking; (2) of South America, used in tobacco breeding, especially for mosaic resistance, also used in virus diagnosis; (4) probably indigenous to Mexico but long cultivated by the North American Indians and occasionally persisting in the Eastern and South Central States; the principal tobacco cultivated for smoking in some parts of Europe and Asia.

Cercospora nicotianae Ell. & Ev., leaf spot. Tex. (3).
Oidium sp., powdery mildew. N.Mex. (5).
Peronospora tabacina Adam, downy mildew. Nev. (1), Tex. (3).
Pseudomonas tabaci (Wolf & Foster) F.L.Stevens, wildfire. Pa. (4).
Puccinia aristidae Tracy (O,I), rust. Ariz. (5). II and III on various grasses.
Pythium ultimum Trow, damping-off. Calif. (1,5).
Thielaviopsis basicola (Berk. & Br.) Ferr., black root rot. Va., Wis. (2).
Uredo nicotianae Anas., Sacc., & Splendore (II), rust. Calif., Nev. (1).
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif., Tex. (4).
LEAF ROLL—unidentified virus. P.R. (4).
MOSAIC—virus (*Marmor tabaci* Holmes, Nicotiana virus 1 K.M.Sm.). On (2,4). Natural infection not reported, but these hosts commonly used in experiments. Infection also results from inoculation with etch, ring spot, streak, and veinbanding viruses (q.v. under *N. tabacum*); also cucumber mosaic (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.), potato yellow dwarf (*Marmor vastans* Holmes, Solanum virus 16 K.M.Sm.), and turnip mosaic (*Marmor brassicae* Holmes, Brassica virus 2 K.M.Sm.).
RING SPOT—tobacco virus (*Annulus tabaci* Holmes, Nicotiana virus 12 K.M.Sm.). On (2,4). Natural infection not reported, but artificial inoculation causes systemic chlorotic and necrotic spotting.
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (1).
YELLOWS—aster yellows virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.Y. Also the var. *californicus* Holmes, Callistephus virus 1A K.M.Sm. (western aster yellows virus), in Calif.
FRENCHING—physiological. N.Y.

III. Common Tobacco

Nicotiana tabacum L., tobacco.

Annual (or rarely perennial) herbaceous plant of tropical America, cultivated since prehistoric times by the aborigines and, since the discovery of America throughout the world. In the United States its culture extends from Massachusetts to Florida, Texas, and Minnesota, but the principal producing States are North Carolina, Kentucky, Virginia, Tennessee, South Carolina, Georgia, and Florida; Maryland, Ohio, Pennsylvania, Connecticut, and Wisconsin.

Actinomyces sp., associated with mold (mustiness) of cured tobacco. Mass., Wis.
Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall, sometimes fasciation and witches'-broom. Natural occurrence in the field not reported, but tobacco is a commonly used experimental host.
Alternaria longipes (Ell. & Ev.) Mason, brown spot. Fla., Ga., Md., Mo., N.C., Pa., S.C., Va.
A. tabacina (Ell. & Ev.) Hori, Alternaria leaf spot, in part white spot. Conn., Mass., Mo., N.C., Ohio, Pa. Perhaps a form of the following:
A. tenuis Auct., secondary leaf spot, pole rot in curing sheds. Conn., Ga., Wis.
Ascochyta nicotianae Pass., leaf spot. S.C., Tenn., Wash., P.R.
Aspergillus spp., especially *A. candidus* Lk. ex Fr. and *A. glaucus* Lk. ex Fr., causing mold of manufactured tobacco; *A. niger* v. Tiegh., causing black rot of leaves during curing; these and others cause shed burn and pole rot. Cosmopolitan. *A. niger* and *A. oryzae* (Ahlburg) Cohn are also reported in association with stem rot of field plants in Fla.
Asterocystis radicis de Wild., root rot. N.C. Perhaps identical with *Olpidium brassicae*, q.v., but not confirmed.

Botryosporium pulchrum Cda., white mold of cured tobacco. Conn.

Botrytis cinerea Pers. ex Fr., seedling blight, N.C.; gray mold, shed burn, pole rot of cured tobacco. Conn., Ky., N.C., Va.

Cercospora nicotianae Ell. & Ev., frogeye leaf spot. Mass. to Fla., La., and Wis.; P.R.

Cladosporium herbarum Lk. ex Fr., blossom spot. Conn.; shed mold.—Pa.

Colletotrichum sp. (?*C. nicotianae* Averna-Sacca), anthracnose. Md., Pa., Va., P.R.

C. destructivum O'Gara (=*C. atramentarium* (Berk. & Br.) Taub.), anthracnose. Ky.

Conopholis americana (L. f.) Wallr., parasitic on roots. Tenn.

Corynebacterium fascians (Tilford) Dows., fasciation. Ohio.

Cuscuta sp. (?*C. epithymum* Murr.), dodder. Occasional in seedbeds and fields. Ky., N.C.

Erwinia aroideae (Town.) Holland, blackleg, hollow-stalk rot. Occasional from Mass. to S.C., Ky., and Wis. Also reported as *Erwinia carotovora* (L. R. Jones) Holland.

?Erysiphe sp.—Ky.

E. cichoracearum DC., powdery mildew. Pa.

Eucephalobus oxyuroides (De Man) Steiner, root nematode. S.C.

Fusarium oxysporum Schlecht. f. *nicotianae* (J. Johnson) Snyd. & Hans., Fusarium wilt. Occasional from Mass. to Fla., Miss., and Wis., also P.R.; most frequent in N.C., SC., Va., and Md. Other physiologic races of this species, such as f. *batatas* (Wr.) Snyd. & Hans. and f. *vasinfectum* (Atk.) Snyd. & Hans., are similarly pathogenic and are probably involved in field infections.

Gloeosporium sp.: SEE *Colletotrichum.*

Heterodera sp., on roots. Conn. Resembles *H. rostochiensis* Wr. but apparently differs in pathogenicity.

H. marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. Ga., Ky., Md.

Meloidogyne spp., root knot nematodes. General from Va. to Ky. and southward; also reported in Calif., Conn., Ohio, Pa., T.H.

Mucor spp., including *M. mucedo* L. ex Fr., and *M. racemosus* Fres., mold of cured tobacco and manufactured products. Cosmopolitan.

Olpidium brassicae (Wor.) Dang., in roots of seedlings. Wis. SEE ALSO *Asterocystis radicis.*

Orobanche ludoviciana Nutt. and *O. ramosa* L., broomrape. Ky., Ohio; occasional in other tobacco areas.

Penicillium spp., mold of cured tobacco, mustiness of manufactured products. Cosmopolitan. Sometimes reported as *P. glaucum* Lk., a name of no definite standing.

Peronospora tabacina Adam, downy mildew, "blue mold." Mass. to Fla., Tex., and Ind.; Wis.

Phyllosticta nicotiana Ell. & Ev., leaf spot, chiefly on seedlings. Ala., Fla., Ga., Mass., N.C., S.C., Va., P.R. Sometimes reported as *P. nicotianae* Ell. & Ev. but not originally so spelled. SEE ALSO *Ascochyta nicotianae.*

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Phytophthora parastica Dast. var. *nicotianae* (Breda de Haan) Tucker, black shank. Ala., Fla., Ga., Ky., Md., N.C., Tenn., Tex., Va., P.R.

Pratylenchus pratensis (De Man) Filip., meadow nematode, in part brown root rot, ?coarse root. Conn., Fla., Ga., Ky., N.C., S.C., Va.

Pseudomonas angulata (Fromme & Murray) Holland, angular leaf spot, in part blackfire. General from Mass. to Fla., La., and Wis.; also P.R.; especially in the Southeastern and South Central States.

P. mellea Johnson, Wisconsin bacterial leaf spot. Ky., Tenn., Wis., ?Conn.

P. solanacearum E.F.Sm., bacterial wilt, Granville wilt, slime disease. Atlantic Coast States from Md. to Fla., and P.R. Rare inland but reported from Ohio and Okla.

P. tabaci (Wolf & Foster) Stevens, wildfire. General from Vt. and Mass. to Fla., La., and Wis. Similar diseases have been ascribed to *P. fluorescens* Mig., *P. polycolor* Clara, and *P. aeruginosa* (Schroet.) Mig., all closely relately organisms. [*P. aeruginosa* considered the same as *P. polycolor* by Elrod & Braun, Jour. Bact. 44:633–644. 1942].

Pythium spp., damping-off, bed rot, stem burn of seedlings; sometimes root rot of field plants. Commonly attributed to *P. debaryanum* Hesse and reported in Conn., Ky., Ohio, Pa., Wis., P.R. Other species identified in this connection are: *P. aphanidermatum* (Edson) Fitz. in Conn. and Mass.; *P. polymorphon* Sideris and *P. ?rostratum* Butl. in Ky.; *P. ultimum* Trow in Mo. and Ohio.

Rhizoctonia solani Kuehn, damping-off, bed rot, sore shin of seedlings; sometimes stem rot of field plants. Cosmopolitan but infrequent. The basidial stage, *Pellicularia filamentosa* (Pat.) Rogers, has not been reported on field plants but has been observed in seedbeds.

Sclerotinia minor Jagger, seedling blight. Conn.

S. sclerotiorum (Lib.) d By., seedling blight, bed rot. Conn., Ky., N.C.

Sclerotium bataticola Taub.: SEE *Macrophomina phaseoli.*

Sclerotium rolfsii Sacc., southern blight, stem rot. Fla., Ga., N.C., S.C., Va.

Septomyxa affinis (Sherb.) Wr., blotch, scab. Conn., Fla., Ky., Ohio, Wis.

Thielavia basicola Zopf, on dead roots. Conn., N.C., Wis.; probably cosmopolitan.

Thielaviopsis basicola (Berk. & Br.) Ferr., black root rot. General.

Toruloidea nicotianae (Pezzolato & Sacc.) Sumstine, mold of cured tobacco. Ky., Ohio.

Verticillium albo-atrum Reinke & Berth., Verticillium wilt. Tenn.

Xanthomonas solanacearum (E.F.Sm.) Dows.: SEE *Pseudomonas solanacearum.*

BROAD RING SPOT—unidentified virus. Wis.

CLUB ROOT—cause unknown. tumor-forming virus (*Aureogenus magnivena* Black) suggested. Ky.

CURLY DWARF—suspected virus, perhaps streak, or a distorting strain of mosaic. Conn., Wis.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif., N.Mex., Oreg.

ETCH—virus (*Marmor erodens* Holmes, Nicotiana virus 7 K.M.Sm.). Ga., Ky., N.J., N.Y., Ohio. Several strains of varying degrees of severity have been distinguished by varietal names.

LEAF ROLL—unidentified virus. P.R.

MOSAIC, COMMON, or CALICO, including aucuba or yellow mosaic and various necrotic, burning, and distorting strains—virus (*Marmor tabaci* Holmes, Nicotiana virus 1 K.M.Sm.). General. Numerous strains, differing in symptoms on particular varieties of tobacco, occur in nature; some of these have been distinguished in laboratory cultures by varietal names, such as var. *aucuba, deformans, lethale,* but in nature appear too variable to be thus maintained. A different basis of subdivision is afforded by a distinctive host range, e.g. the plantain strain, *M. tabaci* var. *plantaginis* Holmes, reported on tobacco in Ky.

MOSAIC, CUCUMBER—virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.). Numerous strains reported, e.g. "puffed" in Ky. and Ohio; mild or bleaching mosaic in Wis., also reported in Conn., Fla., Minn., and P.R.; probably widespread but not always distinguished from common mosaic.

MOTTLE—unidentified virus. P.R.

NECROSIS—virus (*Marmor lethale* Holmes, Nicotiana virus 11 K.M.Sm.). Occurrence limited to greenhouse cultures in N.J.; natural occurrence in field and greenhouse in Wis.

RING SPOT—tobacco ring spot virus (*Annulus tabaci* Holmes, Nicotiana virus 12 K.M.Sm.). Mass. and N.Y. to Ga. and Ind. Green, yellow, and other distinctive strains occur in nature, and some have been given varietal names.

SPOT NECROSIS—virus(es). Ky., Wis. Probably due to potato latent-mottle virus (*Annulus dubius* Holmes, Solanum virus 1 K.M.Sm.) alone or in combination with veinbanding virus. Systemic necrotic spotting is also induced in tobacco by artificial inoculation with alfalfa mosaic (*Marmor medicaginis* Holmes, Medicago virus 1 K.M.Sm.), including the potato calico strain (*Marmor medicaginis* var. *solani* Black & Price, Solanum virus 10 K.M.Sm.) and the celery calico virus (*Marmor aevi* Holmes, Apium virus 2 K.M.Sm.).

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif.

STREAK—virus (*Annulus orae* Holmes, Nicotiana virus 8 K.M.Sm.). Conn., Ind., Ky., Mo., Ohio, Tenn., Wis.

VEINBANDING—virus (*Marmor upsilon* Holmes, Solanum virus 2 K.M.Sm.). Ky., Fla., and probably elsewhere in tobacco grown in proximity to potatoes. Sometimes occurs in combination with cucumber mosaic virus.

BROWN ROOT ROT—cause not definitely determined, perhaps meadow nematode. (SEE *Pratylenchus pratensis.*) It is usually attributed to toxic crop residues, excess of cellulose materials in soil, nitrogen deficiency, and various fungi. (SEE *Macrophomina phaseoli* and *Pythium.*) Conn., Ky., Mass., Md., Pa., Va., Wis.

BORON DEFICIENCY (top disease), also BORON TOXICITY (stunting). N.C.

CALCIUM DEFICIENCY (apical necrosis, leaf curling). Conn., Md.

CHLORINE TOXICITY (dwarfing, upward rolling of leaves) —caused by excess of chlorides in fertilizer. Fla., Ga., N.C.

CHLOROSIS—various nutritional deficiencies, commonly of potassium and magnesium ("sand drown"), q.v., usually in light, acid soils; sometimes of iron. Also caused by low temperature. Conn., Fla., Ga., Ky., Md., N.C., S.C.

COARSE ROOT—root swelling and loss of lateral roots perhaps caused by meadow nematode (*Pratylenchus pratensis*), q.v. Fla.

DROUGHT SPOT, "RIM FIRE" (interveinal necrosis)—deficiency of soil moisture, sometimes accentuated by chlorine and potassium deficiency. Ky., N.C., S.C., Va.

FRENCHING, POLYPHYLLY (leaf filiformity, shoot proliferation, sometimes chlorosis)—cause unknown but believed to be nutritional; sometimes associated with soil alkalinity and nitrogen deficiency. Occasional in all tobacco areas. L. H. Jones holds frenching to be caused by high soil temperature (35° C.) at which temperature competition with soil microflora results in deficiency of available iron; discounts soil toxin theory. According to Steinberg (Jour. Agr. Res. 75:81. 1947) frenching symptoms can be reproduced by certain organic bases, e.g. isoleucine and other amino acids resulting from decomposition of organic matter in the soil, perhaps under influence of nonpathogenic soil organisms.

MAGNESIUM DEFICIENCY, "SAND DROWN" (yellowing and interveinal chlorosis in basal leaves progressing upward). Conn., Ga., Md., N.C., S.C., Va.

MANGANESE TOXICITY (interveinal chlorosis, dwarfing). Ky.

PHOSPHORUS DEFICIENCY (necrotic spotting leaf-curling, ?red "rust"). Ky., N.C.

POTASSIUM DEFICIENCY (interveinal chlorosis, leaf curling, marginal burning). Conn., Fla., Ky., Mass., Md., N.C., S.C., Va., Wis.

RUFFLE LEAF—cause unknown, but believed genetic; resembles virus leaf curl (*Ruga tabaci* Holmes, Nicotiana virus 10 K.M.Sm.), which is not known in U. S. Ga., N.C., Va.

WET-WEATHER SPOT, PHYSIOLOGICAL BLACKFIRE—associated with heavy rainfall and deficient drainage. Ky., Ohio, S.C., Tenn., Va.

Petunia

(1) *P. axillaris* (Lam.) BSP., white petunia.
(2) *P. hybrida* Vilm., garden petunia.
(3) *P. violacea* Lindl., violet petunia.
(4) *P. parviflora* Juss., seaside petunia.

Flower-garden annuals of Argentina, widely cultivated for ornament (1,3); (2), a cultigen, existing apparently in numerous horticultural forms derived from (1,3); these sometimes escaping from gardens and persisting; (4) indigenous or introduced from South America, occurring in waste ground in the Gulf States and the Southwest.

Ascochyta petuniae Speg., leaf spot. Tex. (2).

Cercospora petuniae Muller & Chupp, leaf blotch. Fla., Okla. (2).

Choanephora conjuncta Couch, on old flowers. Ga. (2).

Corynebacterium fascians (Tilford) Dows., fasciation. Pa. (2); Calif., Ohio.

Cuscuta spp., dodder. Md., N.J., Okla., Tex., W.Va. (1,2,3).

Fusarium sp., wilt. Wash. (2).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Meloidogyne spp., root knot nematodes. General in the South; also Ariz., Calif., Kans., Md., Wash., T.H.; occasional in greenhouses in the North (1,2,3).

Oidium sp., powdery mildew. Minn., N.Y., W.Va.

Puccinia aristidae Tracy (O,I), rust. Ariz. (4).

Rhizoctonia solani Kuehn, damping-off, stem rot. Fla., N.C., N.J., N.Y., Okla., Pa., Tex. (2).

Sclerotinia ?sclerotiorum (Lib.) d By., Sclerotinia wilt. Wash.

Stemphylium botryosum Wallr., secondary black stem. Tex. (2).

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif., Oreg.

MOSAIC—virus, commonly tobacco mosaic virus (*Marmor tabaci* Holmes, Nicotiana virus 1 K.M.Sm.); sometimes cucumber mosaic virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.)—General (2,3). Systemic infection also results from artificial inoculation with the following viruses:

Alfalfa mosaic (*Marmor medicaginis* Holmes, Medicago virus 1 K.M.Sm.) including the potato calico strain (*M. medicaginis* var. *solani* Black & Price, Solanum virus 10 K.M.Sm.);

Potato mottle (*Annulus dubius* Holmes, Solanum virus 1 K.M.Sm.);

Potato severe mosaic (*Marmor upsilon* Holmes, Solanum virus 2 K.M.Sm.);

Tobacco etch (*Marmor erodens* Holmes, Nicotiana virus 7 K.M.Sm.);

Tobacco veinbanding; and

Turnip mosaic (*Marmor brassicae* Holmes, Brassica virus 2 K.M.Sm.).

RING SPOT—tobacco ring spot virus (*Annulus tabaci* Holmes, Nicotiana virus 12 K.M.Sm.). Va. (3).

YELLOWS—aster yellows virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Mich. (2). Also the var. *californicus* Holmes, Callistephus vi-

rus 1A K.M.Sm. (western aster yellows virus)—Calif. (2,3).

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif.

Physalis, groundcherry, husk-tomato

(1) *P. alkekengi* L., Chinese lanternplant, wintercherry.
(2) *P. ixocarpa* Brot., tomatillo.
(3) *P. peruviana* L., cape-gooseberry.
(4) *P. pubescens* L.
(5) Other species.

Annual or perennial herbs of warm and temperate countries, including many native species of no economic importance except as weeds, and other native or introduced species which are cultivated for ornament or edible fruit (1,2,3, 4). Some of the perennial species are common overwintering hosts of viruses that affect various crops.

Aecidium physalidis Burr. (O.I), rust. Wis. to Tex., N.Mex., and Colo. (chiefly on *P. heterophylla* Nees, *P. lanceolata* Michx., *P. longifolia* Nutt., and *P. virginiana* Mill.).

Alternaria solani (Ell. & G. Martin) Sor., leaf spot.

Cercospora diffusa Ell. & Ev., leaf spot. Ill., Kans., Wis. (5).

C. physalicola Ell. & Barth., leaf spot. P.R. (3); Conn. to Ga., Tex., and Nebr. (5).

C. physalidis Ell., leaf spot. Ga., Ind., Wis. (4); Ind., Iowa, Kans., Ky., Mich., Nebr., Wis. (5).

Ditylenchus dipsaci (Kuehn) Filip., leaf and stem nematode. Calif. (4). Utah (5).

Entyloma australe Speg., white smut. Conn., N.Y. (1); Mass. to Miss., N.Mex., and N.Dak. (4,5).

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Irene inermis (Kalch. & Cke.) Th. & Syd., black mildew. T.H. (3).

Leptosphaeria physalidis Ell. & Ev., leaf spot. Ky. (4).

Meloidogyne spp., root knot nematodes. Fla. (2,3), Ala. (5).

Pellicularia filamentosa (Pat.) Rogers, on stem bases. Wis. (on *P. heterophylla*).

Phyllosticta sp., leaf spot. Okla.

P. physaleos Sacc., leaf spot. Conn. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (5).

Pseudomonas angulata (Fromme & Murray) Stapp, angular leaf spot. Ky. (on *P. subglabrata* Mackenzie & Bush.).

P. tabaci (Wolf & Foster) F.L.Stevens, wildfire. Pa. (on *P. virginiana*).

Puccinia physalidis Pk. (III), rust. Colo., Iowa, Minn., Nebr., Wis. (on *P. heterophylla, P. lanceolata,* and *P. virginiana*).

Septoria sp., leaf spot. Nebr. (5).

Stemphylium solani Weber, gray leaf spot. Fla. (4).

Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (1).

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (on *P. wrightii* A. Gray).

MOSAIC—virus(es). In part cucumber mosaic virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.), reported in Fla., Ind., Iowa, Ky., N.Y., Tex., Wis. (1,3,4,5) and especially on *P. heterophylla* and *P. subglabrata*. Also, tobacco mosaic virus (*Marmor tabaci* Holmes, Nicotiana virus 1 K.M.Sm.)—Conn., Ind., Ky., N.Y. (1,3,4,5). Natural infection with potato rugose mosaic (*Marmor upsilon* Holmes, Solanum virus 2 K.M.Sm.) is reported on *P. heterophylla* and *P. virginiana* in Wis. Systemic infection from artificial inoculation is reported with the following viruses:

Potato mottle (*Annulus dubius* Holmes, Solanum virus 1 K.M.Sm.) on (1);

Potato yellow dwarf (*Aureogenus vastans* (Holmes) Black, Solanum virus 16 K.M.Sm.) on (4) and *P. heterophylla;*

Tobacco etch (*Marmor erodens* Holmes, Nicotiana virus 7 K.M.Sm.) on (4) and *P. heterophylla;*

Tobacco ring spot (*Annulus tabaci* Holmes, Nicotiana virus 12 K.M.Sm.) on *P. angulata* L.; and

Turnip mosaic (*Marmor brassicae* Holmes, Brassica virus 2 K.M.Sm.).

RING SPOT—probably tobacco ring spot virus. Ky.

Quincula

Q. lobata (Torr.) Raf., purple-flowered groundcherry.

Perennial herb of plains and mesas in the Southwest, may be grown for ornament in rockeries.

Cercospora physalidis Ell., leaf spot. Kans.

Puccinia aristidae Tracy (O,I), rust. Colo.

Salpiglossis

S. sinuata Ruiz & Pav., painted-tongue.

Annual herb of Chile, grown for ornament in gardens and under glass.

Fusarium sp., wilt. Wash.

Meloidogyne sp., root knot nematodes. N.Y.

Pratylenchus pratensis (De Man) Filip., root nematode. N.Y.

Verticillium albo-atrum Reinke & Berth., wilt. N.Y.

YELLOWS—western aster yellows virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif.

Schizanthus, butterfly-flower

Schizanthus spp., chiefly *S. pinnatus* Ruiz & Pav.

Annual showy-flowered herbs of Chile, grown for ornament in gardens and under glass.

Colletotrichum schizanthi C.N.Jens. & V.B. Stewart, anthracnose. N.Y.

Meloidogyne sp., root knot nematodes. U. S., no place specified.

Pythium ultimum Trow, damping-off. Mo.

Rhizoctonia solani Kuehn, damping-off, root rot. N.Y.

Sclerotinia sclerotiorum (Lib.) d By., stem rot. Miss., Mo.

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Tex.

YELLOWS—aster yellows virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.J.

Solanum

I. Ornamental Species

(1) *Solanum capsicastrum* Link, false Jerusalem-cherry.
(2) *S. dulcamara* L., nightshade, bittersweet.
(3) *S. integrifolium* Poir., scarlet, or tomato, eggplant.
(4) *S. pseudocapsicum* L., Jerusalem-cherry.

Old World shrubs (1,4) or vine (2) and an annual herb of Africa (3), grown for orna-

merit; (2) locally naturalized. Many other species are occasionally cultivated in warm regions.

Agrobacterium tumefaciens (A.E.Sm. & Town.) Conn. crown gall. Conn. (2).
Alternaria solani (Ell. & G.Martin) Sor., leaf spot.
Ascochyta lycopersici Brun., leaf spot. N.Y., Ohio (2).
Cercospora dulcamarae (Pk.) Ell. & Ev., leaf spot. Mich., N.Y., Wis. (2).
Cuscuta gronovii Willd., dodder. N.Y. (2).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Md. (1); Calif., Oreg. (4).
Mycosphaerella solani (Ell. & Ev.) Wr., leaf spot. Ohio (2).
Phyllosticta pseudocapsici Roum., leaf spot. La. (4).
Phytophthora infestans (Mont.) d By., late blight. Md., N.Y. (2).
Stemphylium solani Weber, gray leaf spot. Fla. (4).
Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (3).
Mosaic—unidentified (probably tobacco mosaic) virus. Iowa (2), Va. (4).
Tip blight—virus (*Lethum australiense* Holmes var. *lethale* Holmes, Lycopersicon virus 3 K.M.Sm.). Oreg. (1).

II. Miscellaneous Native Species (Mostly Weeds)

(1) *Solanum carolinense* L., Carolina horsenettle.
(2) *S. elaeagnifolium* Cav., silverleaf nightshade, white horsenettle.
(3) *S. nigrum* L., black nightshade; including vars. *villosum* Mill. and *guineense* L.
(4) *S. rostratum* Dunal, beaked nightshade, buffalo-bur.
(5) *S. triflorum* Nutt., cutleaf nightshade.

Perennial (1,2) or annual (3,4,5) herbs of prairies, waste ground, and weeds in cultivated ground, especially (1,2,3). All furnish food for wildlife; garden forms of *S. nigrum* var. *guineense* L. are grown for edible fruit.

Alternaria solani (Ell. & G. Martin) Sor., early blight, leaf spot. Tex., Va., Wis. (1); Fla., Tex., W. Va. (3); Kans., Tex. (4).
Ascochyta lycopersici Brun., leaf spot. Del. (1).
Cercospora atromarginalis Atk., leaf spot. Tex. (1,2); Ala., Fla., Ga., Tex., P.R. (3). Also reported under the probable synonyms, viz.: *C. rigospora* Atk., *C. tosensis* P.Henn., and *?C nigri* Tharp.
C. carolinensis Tharp, leaf spot. Tex. (1).
C. solani Thuem. (*C. nigrescens* Wint.)—La., Tex. (3).
Colletotrichum atramentarium (Berk. & Br.) Taub., on stems. Tex. (2,3,4).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. Oreg. (3).
D. phyllobius (Thorne) Filip., leaf nematode. Tex. (2).
Entyloma australe Speg., white smut. Iowa, Kans. (3); Mont., N.Dak. (5).
Erysiphe cichoracearum DC., powdery mildew. Ala., Iowa, Md., N.C., Pa., Tex. (1); Calif., Wash. (3).
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
H. schachtii Schmidt, root nematode. Utah (3).
Macrophoma subconica Ell. & Ev., leaf spot. La., Tex. (3).
Meloidogyne spp., root knot nematodes. Calif., Md., Nev., Oreg. (3); ?Fla., ?S.C. (1,3,4).
Microsphaera sp., powdery mildew. Ill. (1).
Phyllosticta dulcamarae Sacc., leaf spot. Ind., Mo., Tex. (1).
P. solani Ell. & G. Martin, leaf spot. Ky., Ohio (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,3,4).
Phytophthora infestans (Mont.) d By., late blight. Oreg. (3). On *S. sarachoides* Sendt. in Calif.
Pseudomonas solanacearum E.F.Sm., bacterial wilt. P.R. (3).
P. tabaci (Wolf & Foster) F.L.Stevens, wildfire. Wis. (3).
Puccinia substriata Ell. & Barth. (*Aecidium tubulosum* Pat. & Gaill.), (O,I), rust. Tex. (2,?3).
Pyrenochaeta terrestris (Hans.) Gorenz, J.C.Walker, & Larson, stem canker. Okla. (1).
Rhizoctonia crocorum DC. ex Fr., violet root rot. Tex. (2).
R. solani Kuehn, root rot. Tex. (2,3,4).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Tex. (2).
Sclerotium rolfsii Sacc., southern blight. Fla., Tex. (3).
Septoria lycopersici Speg., leaf spot. Del., Md., Tex., Va. (1).
S. solanina Speg.—Calif. (3).
?Stemphylium solani Weber, leaf spot. Ind. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Md., N.J. (1); N.Y. (1,2,4); Calif. (3).
Xanthomonas solanacearum (E.F.Sm.) Dows.: See *Pseudomonas solanacearum*.

Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (species not designated); Tex. (1,3,4).
Leaf roll—potato leaf roll virus (*Corium solani* Holmes, Solanum virus 14 K.M.Sm.). Oreg., Wash. (3).
Mosaic—virus(es). In part tobacco mosaic virus (*Marmor tabaci* Holmes, Nicotiana virus 1 K.M.Sm.) reported on (1) in Fla., Ind., Ky.; on (3) in Iowa and Ohio; in part unidentified in Fla. (1,3); Tex. (2); and Ind., Ohio, Utah, Wash. (3). The cucumber mosaic and tobacco etch viruses cause systemic infection of (1) and (3); and the potato mottle and veinbanding viruses of (3) by artificial innoculation.
Necrosis—tobacco necrosis virus (*Marmor lethale* Holmes, Nicotiana virus 11 K.M.Sm.). Wis. (3).
Ring spot—virus (*Annulus tabaci* Holmes, Nicotiana virus 12 K.M.Sm.). Ky., Va. (1).
Yellows—western aster yellows virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (3).

III. Cultivated Economic Species

(1) *Solanum melongena* L., eggplant.

Perennial herb or subshrub of southern Asia from which the cultivated eggplant, var. *esculentum* Nees, is derived; commonly grown as an annual in gardens throughout the United States except in the Far North; commercial culture chiefly in Florida, New Jersey, Louisiana, and Texas.

(2) *S. torvum* Sw., berenjena cimarrona.

A tall, shrublike weed of the Caribbean region on which the cultivated plant is sometimes grafted.

Actinomyces sp., on roots. Mich. (1).
Alternaria solani (Ell. & G. Martin) Sor., early blight, leaf spot found chiefly in seedbeds, ?dry rot of fruit. Occasional, N.Y. to Fla., La., and Wis. (1). The fruit rot phase is perhaps caused by *Alternaria tenuis* Auct., commonly occurring as a secondary invader of spotted leaves.
Ascochyta lycopersici Brun. (*Diplodina lycopersici* Hollós), leaf spot. Del., Ill., Ind., N.Y. (1). In Europe said to be the conidial stage of *Didymella lycopersici* Kleb., the ascigerous stage not recorded

here. *A. solani-nigri* Died. is also reported in N.Y. (1).

Botrytis cinerea Pers. ex Fr., gray-mold rot of fruit. Calif., Conn., Mass., N.J., Va., and Wash. Occasionally on stems (?secondary) in fields.

Cercospora melongenae Welles (?*C. capsici* Heald & Wolf, ?*C. physalidis* Ell.), leaf spot. Calif., T.H.

C. trichophila F.L.Stevens—P.R. (2)

Cladosporium fulvum Cke., leaf mold. P.R. (1,2).

Colletotrichum spp., anthracnose. Occasional, N.Y. to Fla. and Tex.; Okla., Utah, P.R. Sometimes identified as *C. atramentarium* (Berk. & Br.) Taub. (*C. solanicola* O'Gara) or *C. nigrum* Ell. & Halst.; probably includes saprophytic forms and also *Gloeosporium melongenae*, q.v.

C. truncatum (Schw.) Andrus & Moore, fruit rot. Miss.

Cuscuta spp., dodder. Kans., N.J., Pa., Va.

C. epithymum Murr.—Va.

Diaporthe arctii (Lasch) Nits., on stems. Ga.

D. vexans Gratz: SEE *Phomopsis vexans*.

Diplodia natalensis P.Evans, fruit spot. Fla., P.R.

Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. N.J.

Erysiphe cichoracearum DC., powdery mildew. P.R. (2).

Fusarium sp., wilt. (?secondary). Reported occasionally in all eggplant-growing areas, especially in the Middle Atlantic and Southern States, but specific identification and proof of pathogenicity lacking. *Hypomyces ipomoeae* (Halst.) Wr., associated with the conidial stage *F. solani* (Mart.) Appel & Wr., is sometimes found on dead stems.

Gloeosporium melongenae Ell. & Halst., anthracnose, ripe rot. Occasional, N.J. to Fla., Tex., and Iowa. Probably a conidial race of *Glomerella cingulata* (Ston.) Spauld. & Schrenk but not definitely connected therewith. SEE *Colletotrichum*.

Glomerella cingulata (Ston.) Spauld & Schrenk, anthracnose. Iowa.

Gnomonia sp., on dead stems. La.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot of stems. N.J.

Meliola solani F.L.Stevens, black mildew. P.R. (2).

Meloidogyne spp., root knot nematodes. General in the Southern States; occasional northward, reported in Kans., Mo., Pa., Nev.; T.H.

Nectria sp., *N. ipomoeae* Halst.: SEE *Fusarium*.

Peronospora tabacina Adam, downy mildew (in seedbeds). S.C.

Phomopsis vexans (Sacc. & Syd.) Harter, fruit rot, Phomopsis blight, tipover. General in fields and markets, especially in the South. This is apparently the *Phyllosticta hortorum* of American authors, not Speg.; also reported as *Ascochyta hortorum* (Speg.) C.O.Sm., but *A. lycopersici* Brun. is distinct. The ascigerous stage, *Diaporthe vexans* Gratz, is known only in cultures.

Phyllosticta solani Ell. & G. Martin, leaf spot. La.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Phytophthora infestans (Mont.) d By., late blight. Fla., N.Y.

P. parasitica Dast. (*P. terrestris* Sherb.) fruit rot. Fla., Ind., P.R.

Pratylenchus pratensis (De Man) Filip., root nematode. Tex.

Pseudomonas solanacearum E.F.Sm., bacterial wilt. General in the South (Va. to Fla. and Tex.). T.H. and P.R.; occasional northward to Mass. and Ind. (1); P.R. (2).

Puccinia substriata Ell. & Barth. (O,I), rust. P.R. (2).

Pythium aphanidermatum (Edson) Fitz., cottony leak. Calif., Fla., Tenn. *P. acanthicum* Drechs. is reported to cause a similar fruit rot in Calif.; *P. butleri* Subr. in P.R.; and *P. myriotylum* Drechs. in Fla.

P. debaryanum Hesse, damping-off. Conn., La., N.J., N.Y., P.R.

Rhizoctonia solani Kuehn, damping-off, stem rot, fruit rot. General. *R. melongena* Matz and *R. microsclerotia* Matz, causing stem rot and wilt in P.R., might possibly be forms of *R. solani*. all ?referable to *Pellicularia filamentosa* (Pat.) Rogers in the basidial stage.

Rhizopus stolonifer (Ehr. ex Fr.) Lind, fruit rot. Calif., Ind., Tex.

Sclerotinia sclerotiorum (Lib.) d By., stem rot. Calif., Fla., Ind., La., Oreg., Tex.

Sclerotium rolfsii Sacc., southern blight. Va., to Fla. and Tex.; P.R.

Septoria lycopersici Speg., leaf spot. Ind., Md., N.C., Va., T.H.

Stemphylium solani Weber, gray leaf spot. Fla.

Verticillium albo-atrum Reinke & Berth., wilt. General, including the Pacific States. The forms (or closely related species) identified as *V. dahliae* Klebahn are reported in Mass., N.Y., and Wash.; *V. lycopersici* Pritchard & Porte in Utah; *V. ovatum* G.H.Berkeley & A.B.Jackson in Mass.

Xanthomonas solanacearum (E.F.Sm.) Dows.: SEE *Pseudomonas solanacearum*.

BUNCHY TOP—suspected virus. Tex.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Oreg., Tex., Wash.

MOSAIC — virus(es). In part cucumber mosaic virus (*Marmor cucumeris* Holmes, Cucumis virus 1 K.M.Sm.) reported in Fla.; also unidentified virus, perhaps tobacco mosaic, reported in Ariz., Colo., Conn., Fla., Ind., Iowa, Mass., Mich., N.J., Pa., Tex., Va. The potato calico strain of alfalfa mosaic virus may also cause systemic infection.

SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (1).

YELLOWS—unidentified virus related to cucumber mosaic group. Fla., La., Okla., S.C., Tex., T.H.

S. tuberosum L., potato

Herbaceous cultigen of prehistoric times, originating in the Andean highlands of South America, introduced into Europe in the 16th century, and thence distributed to temperate regions throughout the world. Cultivated in the United States in all States, the principal maincrop producing areas are in the Northeastern (Maine, New York, Pennsylvania), the North Central (Michigan, Wisconsin, Minnesota, North Dakota), the Western (Idaho, Colorado, Nebraska), and the Pacific States (California, Oregon, Washington). The principal early- and intermediate-crop areas are in the Southern (South Carolina to Florida, Texas, and Oklahoma), the Middle Atlantic (New Jersey to North Carolina), the South Central States (Tennessee to Kansas), and California.

Acrostalagmus cinnabarinus Cda.: SEE *Verticillium cinnabarinum*.

Actinomyces scabies (Thaxt.) Güssow: SEE *Streptomyces scabies*.

Alternaria solani (Ell. & G. Martin) Sor., early blight. General. Tuber rot caused by this fungus is also reported in Ariz., Ark., Colo., Fla., Maine, Mich., Minn., N.C., N.Dak., and Wis.

Armillaria mellea Vahl ex Fr., mushroom root rot. Calif., Mich., Oreg., Wash., Wis., Wyo.; tuber rot. Fla.

Ascochyta lycopersici Brun., leaf spot. Oreg., Alaska.

Aspergillus niger v. Tiegh., secondary tuber rot. Occasional in markets.

Bacillus (*megaterium*) *megatherium* d By., in soil. Isolated aseptically from the interior of healthy potato tubers received from Md., Fla., ?Vt.. Apparently the source of filaments believed to be Actinomycetes by Lutman.

B. mesentericus Trev., slimy soft rot, usually secondary but sometimes primary. Cosmopolitan.

Bacterium polymorphum (Frankland & Frankland) Migula (*Bacillus polymorphus* Frankland & Frankland), seedpiece rot. R.I.

Botrytis cinerea Pers. ex Fr., gray-mold rot, usually of tubers in storage, sometimes in the field; also shoot blight and stem-girdle. Conn., Idaho, Maine, Ohio, and Alaska.

Cercospora concors (Casp.) Sacc., leaf blotch. Ga., Ind., Iowa, Mich., N.Y., Vt., W.Va.

C. solani Thuem. (*C. solanicola* Atk.)—Ala., Tex.

Clonostachys araucariae Cda. var. *rosea* Preuss, secondary tuber rot. Occasional in storage and markets. According to Rader, this is not *Clonostachys* but *Gliocadium*, probably *G. roseum* (Lk.) Bainier. For note on (?) pathogenicity, see Rev. Appl. Mycol. 28:640.

Colletotrichum atramentarium (Berk. & Br.) Taub. (*C. solanicola* O'Gara). On stems and stolons, "black dot disease," "anthracnose." Reported in N.J., N.Y., Ohio, Okla., Oreg., Pa., Tex., Utah, Va., W.Va. but probably general, following wilt and various stem lesions.

Corticium solani (Prill. & Del.) Bourd. & Galz.: See *Pellicularia filamentosa* and *Rhizoctonia solani*.

Corynebacterium sepedonicum (Spieck. & Kotth.) Skapt. & Burkh., bacterial ring rot. General, reported from all States except a few in the South and West.

Cuscuta spp., dodder. Del., Nebr., N.J., Wash.

C. arvensis Beyr. (=*C. pentagona* Engelm.)—Wash.

Cylindrocarpon spp., on necrotic tubers and roots. Species reported include: *C. magnusianum* Wr.—Idaho, N.Y.; *C. radicicola* Wr.—Oreg.

Ditylenchus destructor Thorne, tuber necrosis. Idaho.

Erwinia aroideae (Town.) Holland and *E. carotovora* (L.R.Jones) Holland, slimy soft rot. Cosmopolitan in transit and markets; often in the field following sunscald, frost, wounding, and fungus rots; also cause seedpiece rot under conditions unfavorable for germination; lenticel spot as found in the Chicago markets.

E. phytophthora (Appel) Holland, blackleg. General, especially in the North, less frequent in the South. Typically on stems; also causes seedpiece and tuber rot. Regarded by some authors as a physiological race of *E. carotovora*, *E. astroseptica* (Van Hall) Jennison, or *E. solanisapra* (Harrison) Holland. According to Burkholder *E. atroseptica* is physiologically distinct from *E. carotovora* and only *atroseptica* will produce typical blackleg in potato. No isolates referable to *E. aroideae* were found in this study (Phytopathology 39:887); all were either *E. carotovora* or *E. atroseptica*. *E. atroseptica* antedates Appel's *Bacillus phytophthorus*.

Erysiphe cichoracearum DC., powdery mildew. Ky., ?N.J., Wash. Perithecial stage in Ky. and Wash.; conidial stage only in N.J.

Fusarium spp., wilt, tuber and seedpiece rots, dry rot.

1. Wilt and stem-end rot:
   - *F. oxysporum* Schlecht. emend. Snyd. & Hans., sometimes designated more precisely as *F. euoxysporum* Wr. (*F. oxysporum* f. 1 Wr., or f. *tuberosi* Snyd. & Hans.)—General but more frequent in the East and South.
   - *F. solani* (Mart.) Appel & Wr. var. *eumartii* (Carpenter) Wr.—reported from N.Y. to Md., Okla., Nebr., and Wis., also Colo., Idaho, Mont., Wyo.
   - *F. avenaceum* (Fr.) Sacc.—reported in Maine, Minn., N.Y., Wis., but probably general.
   - *F. solani* f. *radicicola* (Wr.) Snyd. & Hans. (*F. javanicum* Koord., var. *radicicola* Wr.), "jelly" end-rot—Western States, especially Idaho to Colo., Calif., and Wash.; cause of a black rot of tubers in the East and South (N.Y. to Fla.) and Nebr.
2. Dry rot in storage and markets:
   - *F. caeruleum* (Lib.) Sacc.—northern potato areas from Maine to Md., Mo., and Wash.
   - *F. sambucinum* Fckl. f. 6 Wr. (*F. discolor* Appel & Wr. var. *sulphureum* (Schlecht.) Appel & Wr.)—general in the Northern and Central States to Tex. and Idaho.
   - *F. trichothecioides* Wr.—from Ohio and Mich. to Mo., Ariz., Calif., and Wash.; sometimes causes field rot and wilt.
3. Miscellaneous tuber and seedpiece rots and vascular discoloration:
   - *F. angustum* Sherb.—N.Y.
   - *F. bulbigenum* Cke. & Mass.—Ala., Calif.
   - *F. conglutinans* Wr.—Maine
   - *F. orthoceras* Appel & Wr. and var. *longius* (Sherb.) Wr.—widespread.
   - *F. oxysporum* f. *batatas* (Wr.) Snyd. & Hans.—Miss.
   - *F. redolens* Wr.—N.Y.
   - *F. vasinfectum* (Atk.) var. *lutulatum* (Sherb.) Wr.—N.Y. All forms of *F. oxysporum* Schlecht. in the sense of Snyd. & Hans.
   - *F. anguioides* Sherb.—Mont., N.Y.
   - *F. arthrosporioides* Sherb.—Mont., N.Y.
   - *F. culmorum* (W.G.Sm.) Sacc.—widespread.
   - *F. equiseti* Cda. and var. *bullatum* (Sherb.) Wr.—Iowa, Mont., N.Y.
   - *F. flocciferum* Cda.—Idaho, Mont., N.Y.
   - *F. sambucinum* Fckl.—La., Mont., N.Y.
   - *F. scirpi* Lambotte & Fautr. and var. *acuminatum* (Ell. & Ev.) Wr.—widespread.
   - All forms of *F. roseum* Lk. in the sense of Snyd. & Hans.
   - *F. argillaceum* (Fr.) Sacc. (*?Hypomyces solani* Reinke & Berth.)—Ala., La., Maine, Md., N.J., N.Y.
   - *F. dimerum* Penz. and *F. merismoides* Cda. (*?Nectria episphaeria* Tode ex Fr.)—Minn. and N.Y.
   - *F. moniliforme* Sheldon—Calif.
   - *F. solani* (Mart.) Appel & Wr. and *F. solani* var. *martii* (Appel & Wr.) Wr.—cosmopolitan.
   - *F. solani* var. *striatum* (Sherb.) Wr.—Colo.
   - *F. poae* (Pk.) Wr. and *F. sporotrichioides* Sherb. (*?F. tricinctum* Cda.)—Maine and N.Y.

Gliocladium sp. (*?G. solani* (Harting) Petch), secondary tuber rot. Tex.

Gloeosporium sp., on stems, ?anthracnose. Ind., Ohio.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

H. rostochiensis Wr., golden nematode, on roots. N.Y. (Long Island).

Hypomyces ipomoeae (Halst.) Wr., on decaying tubers. Md., N.J. Ascigerous stage of *?Fusarium radicicola*. *H. solani* Reinke & Berth., by some authors considered the ascigerous stage of *F. argillaceum*, by others of *F. solani* in a broad sense, is reported in cultures; records of natural occurrence on potato plants in this country are lacking.

Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. Calif., Ga., Ill., Md., Okla., Tex.

Meloidogyne spp., root knot nematodes. General in the South from Va. to Fla. and Calif.; also Del., Idaho, Kans., Nebr., N.Y., Oreg., Utah, Wash., T.H.

Mycosphaerella solani (Ell. & Ev.) Wr., on necrotic stems and tubers. Maine, N.Y. Ascigerous stage of *?Septomyxa affinis*, q.v.

Nectria spp., on stems or tubers. La., Md., N.J., Va. Associated with *Fusarium* and *Verticillium* spp. as ascigerous stages.

N. brassicae Ell. & Sacc.—N.J.

N. ipomoeae Halst.: See *Hypomyces ipomoeae.*

Neocosmospora vasinfecta E.F.Sm., on tubers. Ala.

Oidium sp. (?*O. solani* Vanha), powdery mildew. Md., N.J., Pa.

Oospora pustulans Owen & Wakefield, skin spot. Pa., Wash. on imported potato tubers; on ?domestic crop in Maine.

Papulaspora coprophila (Zukal) Hotson, on tubers following powdery scab. Maine, Pa.

Pellicularia filamentosa (Pat.) Rogers (*Rhizoctonia solani* Kuehn), black scurf, sprout canker, stem rot, rhizoctonose. General in the sclerotial and mycelial phases; the basidial stage infrequent.

Penicillium sp., in part *P. oxalicum* Currie & Thom, blue-mold rot. Occasional in markets, reported in Idaho, Ind., N.Y., Va.

Phoma sp., on stems, ?canker. Maine to N.J. and Mich.; Calif.

P. dulcamarina Sacc.—Oreg.

P. eupyrena Sacc.—N.Y.

P. solanicola Prill. & Del.—Pa., W.Va.

P. tuberosa Melhus, Rosenbaum & Schultz, tuber rot. Maine, Md., Pa.

Phomopsis sp. (?*P. vexans* (Sacc. & Syd.) Harter), on stems. Tex., ?Oreg.

P. tuberivora Güssow & W.R.Foster, stem-end hard rot. Wash.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Phytophthora drechsleri Tucker, tuber rot, Idaho, Nebr.

P. erythroseptica Pethyb., pink rot, watery rot, wilt. Idaho, La., Maine, Mass., Nebr., N.Y., Okla., R.I.

P. infestans (Mont.) d By., late blight. General, commonly in the Northeastern, Middle Atlantic, and North Central States; occasional in the Gulf and Western States; also T.H. and P.R.

P. parasitica Dast., tuber rot. Ky., Okla., P.R.

Pratylenchus pratensis (De Man) Filip., meadow nematode, on roots. Miss., S.C., Va. Probably *P. scribneri* Steiner, a segregate from this group, specifically identified in Tenn.

Pseudomonas solanacearum E.F.Sm., bacterial wilt, brown rot. Chiefly in the South from Md. to Fla. and Ariz., occasionally reported in the North and West (Mass., Ohio, Mich., Ill., Iowa, Nebr., Idaho), but some of these reports have probably confused this disease with bacterial ring rot. See *Corynebacterium.*

Pythium sp., water rot, leak. Chiefly *P. debaryanum* Hesse, reported commonly in the West (Calif., Colo., Idaho, Minn., Mont., N.Dak., Nebr., Wash., Wyo.), occasionally in the East and South (Conn., La., Miss., N.J., N.Y.). *P. aphanidermatum* (Edson) Fitz. and *P. ultimum* Trow are reported on tubers in Calif.; *P. arrhenomanes* Drechs. and *P. rostratum* Butl. on roots in T.H.

Ramularia solani Sherb., on necrotic tubers. N.Y.

Rhizoctonia crocorum (Pers.) DC. ex Fr., violet root rot, sometimes on tubers. Mass., Mont., N.Dak., Nebr., N.Y., Okla., Oreg., Tex., Wash. Sterile stage of *Helicobasidium purpureum* Pat.

R. solani Kuehn, black scurf, sprout canker. General. Jelly-end rot in Calif. and Idaho. Sterile stage of *Pellicularia filamentosa,* q.v.

Rhizopus spp., leak. Calif., Idaho, Ohio, Tex., Wash. Commonly *R. stolonifer* (Ehr. ex Fr.) Lind (*R. nigricans* Ehr.); similar tuber rot may be caused by *R. tritici* K. Saito.

Sclerotinia sp., stem rot. Fla., Maine, S.C.

S. minor Jagger—Calif.

S. sclerotiorum (Lib.) d By.—Fla., Mass., Mont., N.Y., Oreg., Tex., Wash.

Sclerotium bataticola Taub.: See *Macrophomina phaseoli.*

Sclerotium rolfsii Sacc., southern blight. N.C. to Fla., Ariz., and Okla.; T.H., P.R. Sterile stage of *Pellicularia rolfsii* (Curzi) E. West.

Septomyxa affinis (Sherb.) Wr., on necrotic stems and tubers, ?saprophytic. Maine, N.Y.

Spondylocladium atrovirens Harz., silver scurf. General in the Eastern and Central States and Pacific Northwest, less frequent in the South.

Spongospora subterranea (Wallr.) Lagh., powdery scab. Occasional in the North (Maine to Pa., Minn., Wyo., and Wash.); also Ala., Fla., Miss., Okla., S.C.

Streptomyces scabies (Thaxt.) Waks. & Henrici, scab on tubers, stolons, and roots. General.

Stysanus stemonitis Cda., secondary tuber rot, speck rot, "brown disease." Idaho, Ind., Mass., Mich., Nebr., N.Y., Oreg.

Synchytrium endobioticum (Schilb.) Perc., wart. Restricted areas in Md., Pa., W.Va.

Trichothecium roseum Lk. ex Fr., pink-mold rot. Idaho, Minn.

Tylenchus penetrans Cobb, on tubers. Mich.

Vermicularia sp.: See *Colletotrichum.*

Verticillium albo-atrum Reinke & Berth., wilt, ?dry rot. Chiefly in the Northeastern, Western, and Pacific States; also Ark., Fla., La., Va.

V. cinnabarinum (Cda.) Reinke & Berth., on decaying tubers. Cosmopolitan. Conidial stage of *Nectria inventa* Pethyb.

Xanthomonas solanacearum (E.F.Sm.) Dows.: See *Pseudomonas solanacearum.*

Xylaria apiculata Cke., tuber rot. Fla.

APICAL LEAF ROLL—unidentified virus related to, but not identical with, eastern aster yellows; perhaps synonymous with yellowtop. Maine, ?Nebr.

ASTER YELLOWS, CALIFORNIA STRAIN—virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. For eastern aster yellows, see Purpletop.

AUCUBA MOSAIC—virus (*Marmor aucuba* Holmes, Solanum virus 9 K.M.Sm.). Maine, Md. in experimental stocks; not in commercial potatoes.

BLUESTEM. See PURPLETOP.

CALICO—potato-calico-strain of alfalfa mosaic virus (*Marmor medicaginis* Holmes var. *solani* Black & Price, Solanum virus 10 K.M.Sm.). Chiefly in the Western States from Mont. to Colo., Calif., and Wash.; also Iowa, Mich., Nebr., N.Y., N.Dak., Tex.

CRINKLE, CRINKLE MOSAIC—strain of mild mosaic virus (*Marmor solani* Holmes, Solanum virus 3 K.M.Sm.), usually with latent virus. General, but less frequent than mottling strain.

CURLY DWARF—virus complex, sometimes equivalent to rugose mosaic (severe mosaic plus latent viruses) with which spindle tuber or other viruses may be associated; originally referred in Maine to a virus complex of leaf-rolling mosaic, spindle tuber, and latent viruses. See also UNMOTTLED CURLY DWARF.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif., N.Mex., Oreg., Tex., Wash.

GIANT HILL. See under Nonparasitic and Miscellaneous Diseases.

HAIR SPROUT—in part virus, especially witches'-broom; in part an effect in tubers induced by occurrence of psyllid yellows in the plant. Chiefly in seed tubers of western origin (psyllid yellows type), reported in Calif., Colo., Idaho, Kans., Mont., Oreg.; probably other types reported occasionally in the East and South (Fla., La., Mich., Minn., N.Y., W. Va., Wis).

HAYWIRE—?virus, unidentified; probably of purpletop or yellowtop group; perhaps in part psyllid yellows. Colo., Idaho, Kans., Mont., Nebr., Tex., Wyo.; ?La., Miss.

INTERVEINAL MOSAIC—in part a strain of latent (mottle) virus, as in Green Mountain variety in Maine; also known as potato virus B and Up-to-Date streak virus; in part an unidentified virus, also called super-mild mosaic, occurring in certain varieties in the Northwestern States.

LATENT VIRUS. See MOTTLE.

LEAF ROLL—virus (*Corium solani* Holmes, Solanum virus 14 K.M.Sm.). General.

LEAFROLLING MOSAIC—virus (Solanum virus 11 K.M. Sm.). Maine, Mont., N.Dak., Oreg., Utah, Wis.

MILD MOSAIC, VEINAL MOSAIC—potato mild-mosaic virus, potato virus A (*Marmor solani* Holmes, Solanum virus 3 K.M.Sm.); latent virus also typically present. General. Strains differ in intensity of symptoms, including both mottling and crinkling.

MOTTLE (acronecrosis, top necrosis)—potato mottle virus, potato virus X, potato latent virus (*Annulus dubius* Holmes, Solanum virus 1 K.M.Sm.). Universal and nearly or quite symptomless in the older commercial potato varieties of the U. S.; new varieties grown from seed generally free. Most strains cause top necrosis (streak) when first introduced into a variety, subsequently some become more or less completely masked, some cause mottling or necrotic spotting.

NET NECROSIS—diffuse vascular necrosis in tubers, usually a transitory symptom of leaf roll infection in certain varieties, such as Green Mountain, sometimes of purpletop or yellowtop; may also result from psyllid yellows.

PSYLLID YELLOWS. See under Nonparasitic and Miscellaneous Diseases.

PURPLETOP, BLUESTEM, ?PURPLE DWARF—virus, typically the eastern strain of aster yellows (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.), reported in Maine, N.J., N.Y., Pa., and W.Va.; the western strain (*C. callistephi* var. *californicus* Holmes) in Calif.; these, or perhaps other viruses, may be the cause of purpletop as reported in the Central States from Mich. to Nebr., Okla., and N.Dak.

RING SPOT—virus, in part tobacco ring spot (*Annulus tabaci* Holmes, Nicotiana virus 12 K.M.Sm., yellow strain), reported in Ky. and Va.; in part a strain of potato mottle virus, reported as virulent ring spot and punctate necrosis in Wis. and Minn.; also unidentified virus in Colo., Wyo. "Potato ring spot," as usually reported, refers to the symptoms induced in tobacco by certain strains of potato mottle virus, not to ring spot symptoms in potato.

RUGOSE MOSAIC, severe mosaic (acropetal necrosis, leaf-drop streak, veinbanding, potato virus Y)—virus (*Marmor upsilon* Holmes, Solanum virus 2 K.M. Sm.); mottle or X virus typically present, latent or intensifying the symptoms. General, but more frequent in the South and intermediate-crop potato areas, less so in the Far North. Strains differ in symptoms, especially the extent of necrosis, so that the cited names refer to closely related, not necessarily identical viruses. The term veinbanding refers to symptoms induced in tobacco.

RUSSET DWARF—virus. Idaho. Probably rugose mosaic, q.v.

SPINDLE TUBER—virus (*Acrogenus solani* Holmes, Solanum virus 12 K.M.Sm.) General. See also UNMOTTLED CURLY DWARF.

SPINDLING SPROUT—in part virus, equivalent to hair sprout; may also refer to sprout attenuation induced by other viruses, such as aster yellows, potato witches'-broom, and leaf roll; or by other diseases, such as psyllid yellows.

SPOT NECROSIS—strain of potato mottle virus that causes necrotic spotting in tobacco, reported in Wis., Ky., and probably elsewhere. Punctate necrosis, reported on potato in Wis., is caused by another strain of this virus.

SPRAING (concentric necrosis, certain forms of internal browning)—perhaps virus, but see under Nonparasitic and Miscellaneous Diseases.

STEM-END BROWNING—perhaps virus but see under Nonparasitic and Miscellaneous Diseases.

STREAK—virus, usually rugose (severe) mosaic together with mottle virus, equivalent to leaf-drop streak; another type, more accurately acronecrosis, is caused by mottle virus in hypersensitive varieties.

UNMOTTLED CURLY DWARF—strain of spindle tuber virus (*Acrogenus solani* Holmes var. *severus* Holmes, Solanum virus 13 K.M.Sm.). Maine (rare), Mont., N.Dak., Nebr., Oreg.

VEINBANDING. See RUGOSE MOSAIC.

WITCHES'-BROOM—potato witches'-broom virus (*Chlorogenus solani* Holmes, Solanum virus 15 K.M.Sm.). Chiefly from Mich. to Iowa, Tex., and Wash.; also Fla., Maine, and W.Va. from western seed potatoes.

YELLOW DWARF—potato yellow dwarf virus (*Aureogenus vastans* (Holmes) Black, Solanum virus 16 K.M.Sm.). Eastern and North Central States, Maine (rare) to Va., Ind., and Minn.; also Fla., reported but uncertain in Mont., S.Dak., and Wyo. Var. *agalliae* Black, New Jersey strain, differs from the type in vector relationships, but symptoms on potato are similar.

YELLOWTOP—unidentified virus related to aster yellows or witches'-broom, perhaps synonymous with apical leaf roll. Maine, Mont., Nebr.

BLACKHEART—physiological, induced by oxygen deficiency usually with concomitant high temperature. Occasional in transit and storage, sometimes in the field following flooding or overheating.

BLACKENING AFTER COOKING—physiological, variously attributed to climatic effects—drought, heat, deficient light—during tuber growth; also to potassium deficiency, and to chilling in early storage period; in part genetic; attributed also to acid soil. Reported chiefly in the Middle Atlantic and Central States.

BORON DEFICIENCY—impairment of tuber quality; in experiments causing chlorosis and tip blight. N.Y. Boron toxicity from fertilizer has also been observed in Maine, N.J., and N.Y.

BOTTLE-NECK—tuber malformations associated with irregular growing conditions.

CHECKING (skin-roughening, soil scurf)—in part physiological, attributed to fertilizer injury, soil alkalinity, and other factors; in part probably parasitic. See also *Rhizoctonia*, *Spondylocladium*, and *Streptomyces*.

CORKY RING SPOT—cause unknown. Fla., Ind. See also "RING SPOT," this section.

DIMPLE END—cause unknown; large depression at bud end, eyes absent there. Idaho, Oreg., Wash. (rare).

DIMPLE SKIN—cause unknown; numerous smooth pits, distributed over part of tuber. Occasional on Russet Burbank variety.

"ELEPHANT HIDE"—cause unknown, supposedly environmental such as fertilizer burn. Occasional wherever Russet Burbank variety is grown.

FALSE NEMATODE ROT—lesions somewhat resembling those caused by *Ditylenchus destructor* Thorne but nonparasitic; associated with heavy wet soil.

FASCIATION (of tubers and aerial parts)—probably of gentic origin. Idaho.

FEATHERING—mechanical injury to skin of immature tubers, followed by "scald" attributed to desiccation of exposed inner tissue.

GIANT HILL—oversized, late-maturing plants, usually yielding few and sometimes misshapen tubers; attributed to gentic factors (bud mutation). Occasional in all potato areas, more frequent in the North.

GLASSY END—starch deficiency and high water content, usually at stem end, sometimes bud end, of elon-

gated tubers; physiological, associated with immaturity and second growth. Jelly-end rot is a further development involving infection by *Rhizoctonia*, *Fusarium*, and *Pythium*. Calif., Idaho.

GROWTH CRACKS—physiological, due chiefly to fluctuating moisture. Occasional in irrigated potato districts and those with marked climatic variations.

HOLLOW HEART—physiological, typically in oversized tubers with growth continuing beyond the normal period of maturity because of excessive soil moisture and fertility.

HOPPERBURN—leaf-tip and marginal necrosis caused chiefly by feeding of the potato leafhopper, *Empoasca fabae* (Harr.). General in the intermediate-crop areas of the Middle Atlantic, Central, and Western States, rare in the Far North and early crop in the South. See also POTASSIUM DEFICIENCY and TIPBURN.

INTERNAL BLACKENING—discoloration evident in uncooked tubers (distinct from "blackening-after-cooking"), attributed to mechanical injury, such as pressure or bruising. Occasional in transit.

INTERNAL BROWN SPOT (physiological brown spot, rust spot)—discoloration and necrosis of tuber parenchyma, without external symptoms; attributed to various physiologic factors such as temperature and moisture fluctuations during growth, soil acidity, light or muck soils, and mineral deficiencies (calcium, phosphorus); necrotic patterns distinct from net necrosis (virus), stem-end browning (?virus), frost necrosis, and usually from concentric necrosis or spraing. Occasional in all potato areas.

KNOBBINESS, "SECOND GROWTH"—attributed to extreme fluctuations in soil moisture, or to other factors inducing periodic growth; some virus diseases such as witches'-broom or psyllid yellows, also may cause branching and indeterminate tuber growth. Occasional in all potato areas. *Rhizoctonia* injury to stolons and tubers is one of the factors in Idaho.

LENTICEL ENLARGEMENT—caused by wet soil or oxygen deficiency. Occasional.

LIGHTNING INJURY—Occasional, chiefly in the Northeastern and Central States.

MAGNESIUM DEFICIENCY—chlorosis and leaf-drop. Chiefly in sandy soils in the Atlantic Coast States from Maine to S.C.

MAHOGANY BROWNING—form of low-temperature injury characteristic of certain varieties. Maine.

MANGANESE TOXICITY—stem necrosis and defoliation, observed in acid soil. Wis.

"MEASLES"—cause unknown, no consistent pathogenic organism; ?frost in field. Idaho, Wash.

PITTING—superficial spot-necrosis of tubers, attributed to oxygen deficiency in storage. N.Y., Wash.

POINTED ENDS (stem end pointed, bud end normal or enlarged)—irregular growth conditions.

POTASSIUM DEFICIENCY—bronze coloration and marginal necrosis of foliage, sometmies bluish discoloration of tubers. Reported chiefly on sandy soils in the Atlantic Coast States from Maine to S.C.; also Calif., Minn., Wash.

PSYLLID YELLOWS—systemic plant injury with abnormal growth and sprouting of tubers (not tuber-perpetuated); induced by feeding of potato psyllid (*Paratrioza cockerelli* (Sulc.)). Western States from N. Dak. to Tex., Calif., and Idaho, especially in Colo., Utah, and Wyo. See also HAIR SPROUT, under Virus and Related Diseases.

RED XYLEM—bacterial disease of stem-end of tubers. Maine.

"RING SPOT"—cause unknown; superficial, zonate, depressed lesions, especially on Chippewa variety. Reported in Idaho, Wash.

ROUGH TUBERS—extreme knobbiness and second growth.

SCALD—tuber injury caused by overheating and sunburn, usually followed by bacterial decay. Frequent in southern potato areas, Fla. to Tex., and in Calif. and Kans.; occasional in the Eastern and Central States.

SPRAING (concentric necrosis)—form of internal brown spot, q.v., with mostly peripheral, arc-shaped lesions but not clearly distinguished from other types; tuber transmission claimed, perhaps of virus origin. Calif., N.Y.

SPROUT TUBERS ("little potato," potatoes without tops)—physiological, attributed to storage of seed tubers at above-optimum temperature and sprouting in dry, cold soil. Occasional in all potato areas, reported in Ky., Md., Mich., N.C., N.J., N.Y., Oreg., Pa., S.C., Va., Wash.

STEM-END BROWNING—vascular necrosis near stolon attachment of tubers, cause unknown, direct or predisposing effect of a virus suggested. Maine. Stem-end discoloration may result also from heat, drought, and infection by various fungi.

"STITCHED END" (fasciation)—suspected virus or genetic abnormality; is tuber-perpetuated. Idaho, Wash.

STORAGE, or AIR, CHECKING (thumbnail cracks)—rough handling and desiccation.

TIPBURN—physiological, caused by abrupt transition from cool and moist conditions to hot, dry weather; often accompanies hopperburn, but may occur in absence of leafhoppers. General.

WALNUT TOXICITY—wilting caused by toxic root excretion of black walnut trees (*Juglans nigra* L.). N.Y.

SPARGANIACEAE

Sparganium

S. eurycarpum Engelm., burreed.
Marsh or aquatic perennial herb. Range 3,4, 5,7,12,13,16,19,22,25; sometimes used in bog gardens.

Cylindrosporium sparganii Ell. & Ev., leaf spot. Wis.

Stagonospora sparganii (Fckl.) Sacc., leaf spot. Wis.

Uromyces sparganii Cke. & Pk. (II,III), rust. N.Y. to Fla., Nebr., and Wis. O and I unknown.

STAPHYLEACEAE

Staphylea

S. trifolia L., American bladdernut.
Shrub or small tree. Range 22,23,24,25,26, 27,28,29; grown for ornament, zone 3. Several species of European and oriental origin are more common in cultivation, but the available records pertain to this species.

Coryneum microstictum Berk. & Br. var. *staphyleae* W.H.Davis, twig blight. Mass.

Diaporthe staphylina Ell. & Ev., on branches. Mich.

Eutypella fraxinicola (Cke. & Pk.) Sacc., on branches. Ga.

E. staphyleae Dearn. & House—N.Y.

Gloeodes pomigena (Schw.) Colby, on branches. Ind.

Hendersonia staphyleae Ell. & Ev., on twigs. Pa.

Hypomyces ipomoeae (Halst.) Wr., twig blight. Mass.

Hysterium staphylina (Pk.) Dearn. & House, on twigs. N.Y.
Leptosphaeria rubrotincta Ell. & Ev., on branches. Pa.
Metasphaeria staphyleae Dearn. & House and *M. staphylina* (Pk.) Sacc., on branches. N.Y.
Mycosphaerella staphylina (Ell. & Ev.) J.H.Miller, leaf spot. Ga., Kans.
Nectria atrofusca (Schw.) Ell. & Ev., on dead branches. Ga., Md., Pa., Va.
Ovularia isarioides (Ell. & Ev.) Sacc., leaf spot. N.Y. to Mo. and Iowa.
Phyllosticta staphyleae Dearn., on capsules. N.Y.
Septoria cirrhosa Wint., leaf spot. Mo.
Sphaeropsis staphyleae Brun., on dead twigs. N.J., N.Y.

Turpinia

T. paniculata Vent.
Tree of the West Indies and Mexico.

Meliola guignardi Gaill., black mildew. P.R.

STERCULIACEAE

Buettneria

Buettneria spp.
Herbs, shrubs, or trees, native to the eastern and western tropics.

Puccinia filopes Arth. & Holw. (III), rust. C.Z.
Trabutiella buettneriae F.L.Stevens—C.Z.

Firmiana

F. simplex (L.) W. F. Wight (*F. platanifolia* R. Br.), Phoenix-tree, Chinese parasoltree.
Deciduous, smooth-barked ornamental tree of eastern Asia, cultivated in zone 7.

Botryosphaeria ribis Gross. & Dug., on branches. Ala.
Diporthe arctii (Lasch) Nits.—Ga.
Nectria cinnabarina Tode ex Fr., coral spot. Okla.
Phomopsis sp.—Okla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Rhizoctonia microsclerotia Matz, web-blight. Fla.

Fremontia

F. californica Torr., California fremontia, flannel-bush.
Evergreen shrub of range 3,4,5,10,11, sometimes cultivated as an ornamental.

Ascochyta fremontiae Harkn., leaf spot. Calif.
Phytophthora sp., collar rot, stem girdle. Calif. (=*P. cactorum* (Leb. & Cohn) Schroet. on *F. californica*, *F. napensis* Eastw., and *F. mexicana* (Desv.) Macbr.).
Verticillium albo-atrum Reinke & Berth., wilt. Calif.

Theobroma

T. cacao L., cacao.
Small evergreen tree of tropical America, source of commercial cocoa and chocolate; occasionally grown in Puerto Rico, but commercial cultivation is farther south.

Calonectria rigidiuscula (Berk. & Br.) Sacc. (*Fusarium decemcellulare* Brick), on spotted pods and branch cankers. P.R.
Cephaleuros virescens Kunze, algal spot, "red rust." P.R.
Colletotrichum spp., anthracnose, pod spot, dieback. P.R. Various specific names have been applied to what are probably only strains of *C. gloeosporioides* Penz., the conidial stage of *Glomerella cingulata* (Ston.) Spauld. & Schrenk.
Corticium salmonicolor Berk. & Br., thread blight, "pink disease." P.R.
Diplodia theobromae (Pat.) Nowell (*D. caccaoicola* P. Henn.), dieback, brown rot of pods. Fla., P.R., V.I. Conidial stage of *Physalospora rhodina* (Berk. & Curt.) Cke.
Fusarium decemcellulare Brick: See *Calonectria rigidiuscula.*
Marasmius perniciosus Stahel, witches'-broom. [British West Indies].
Nectria bainii Massee: See *Calonectria rigidiuscula.*
Phytophthora palmivora Butl. (*P. faberi* Maubl.), canker, pod rot, wilt. West Indies.
Rosellinia bunodes (Berk. & Br.) Sacc., root rot. P.R.
Spicaria colorans De Jonge, on branches. P.R.

STYRACACEAE

Halesia, silverbell, snowdroptree

Halesia spp., especially *H. carolina* L. (*H. tetraptera* Ellis).
Deciduous shrubs or small trees (*H. monticola* (Rehd.) Sarg. is large). Range 25,27,28, 29,30; much cultivated as ornamentals in zones 4 and 5.

Cercospora halesiae Dearn., leaf spot. Tenn.
Cytospora halesiae Ell. & Ev., on branches. W.Va.
Diaporthe beckhausii Nits. (*D. halesiae* Ell. & Ev.), on branches. W.Va.
D. tetraptera Ell. & Ev., on branches. Ga., W.Va.
Hypoxylon punctulatum (Berk. & Rav.) Cke.—Ga.
Lophiotrema halesiae Fairm., on bark. N.Y.
Phoma halesiae Fairm., on twigs. N.Y.
Polyporus halesiae Berk. & Curt. (*?P. adustus* Willd. ex Fr.), wood rot.
Sirococcus halesiae Ell. & Ev., on branches. W.Va.

Styrax

(1) *S. americana* Lam., American snowbell. Range 25,27,28,29,30.
(2) *S. grandifolia* Ait., bigleaf snowbell. Southern Virginia to Florida.
Deciduous shrubs; (1) grown for ornament in zone 5.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md. (1).
Mycosphaerella punctiformis (Pers. ex Fr.) Schroet.—Ga. (2).

SYMPLOCACEAE

Symplocos, sweetleaf

S. tinctoria (L.) L'Hér., common sweetleaf, horse-sugar, yellowwood, and *S. paniculata* (Thunb.) Miq., sapphire-berry sweetleaf.

Large evergreen shrubs or small trees: *Symplocos tinctoria* in range 27,28,29,30, sometimes grown for ornament in zone 7; *S. paniculata*, of China, is hardy in zone 7.

Exobasidium symploci Ell. & G.Martin, bud gall. Gulf States to N.C. and Ind.
Leptothyrium symploci (Cke.) F. Tassi, on leaves. S.C.
Mycosphaerella sp., on leaves. Ga.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Septoria sp. (different from following species)—N.C. on *S. tinctoria*.
S. stigma Berk. & Curt., leaf spot. Ala.
S. symploci Ell. & G.Martin, leaf spot. Fla., Miss., N.C., Okla., Tex.
S. tinctoria Dearn. & House—Ark.

TAMARICACEAE

Tamarix

Tamarix spp., tamarisk.

Deciduous shrubs or small trees of Europe and Asia, cultivated for ornament and as hedges. *T. pentandra* Pall. is hardy in zone 2; other species commonly cultivated include *T. parviflora* DC. in zone 4, *T. juniperina* Bunge and *T. gallica* L. in zone 5, this latter species locally naturalized throughout its zone.

Botryosphaeria tamaricis (Cke.) Th. & Syd., on branches. S.C.
Diplodia tamariscina Sacc., on branches. N.Y.
Leptosphaeria tamaricis (Grev.) Sacc., on branches. Okla., Pa.
Phymatotrichum omnivorum (Shear) Dug., root rot. Calif., Tex. On all tested species.
Polyporus sulphureus Bull. ex Fr., wood rot. Md.
Pyrenopeziza tamaricis (Roum.) Sacc., on dead stems. N.Y.
Sphaerotheca humuli DC. ex Burr., powdery mildew. Ind.

TAXACEAE

Cephalotaxus

See page 57.

Podocarpus[19]

Podocarpus spp., especially *P. elongatus* (Ait.) L'Hér., *P. macrophyllus* (Thunb.) D. Don, and *P. nagi* (Thunb.) Pilger.

Coniferous evergreen trees or shrubs of South Africa, Australasia, and Japan, cultivated for ornament and as hedge plants in the Far South and California.

Corynelia portoricensis (F.L.Stevens) Fitz., on living leaves. On *P. coriaceus* Rich. in P.R.

Taxus, yew

(1) *T. brevifolia* Nutt., Pacific or western yew.

Evergreen tree of range 1,2,4,12; grown for ornament; hardy in zone 6.

(2) *T. canadensis* Marsh., Canada yew, ground-hemlock.

Straggling evergreen shrub. Range 21,22,23, 24,26,27. Furnishes food for wildlife, seeds and wilted foliage fatal to livestock; grown for ornament, zone 2.

(3) Other species.

Horticultural types, chiefly forms of *T. baccata* L., English yew, an evergreen tree of Europe, cultivated for ornament, zone 6; and *T. cuspidata* Sieb. & Zucc., Japanese yew, an evergreen tree of northeastern Asia, cultivated for ornament, zone 4.

Armillaria mellea Vahl ex Fr., root rot. Idaho (1).
Botryosphaeria ribis Gross. & Dug., on twigs. Pa. (3).
Diplodia taxi (Sow. ex Fr.) de N., on needles. Oreg. (1), N.Y. (2).
Fomes hartigii (Allesch.) Sacc. & Trott. (?*F. robustus* Karst.), brown cubical heart rot. Oreg. (1).
F. roseus (Alb. & Schw. ex Fr.) Cke.—Idaho (1).
Herpotrichia nigra Hartig, needle blight. Idaho (1).
Leptothyrium sp., on needles. N.Y. (2).
Pestalotia sp., on twig cankers (?secondary). Pa. (3).
P. funerea Desm., twig blight. Mass. (3).
Phacidium taxi Fr., on needles. Wis. (2).
P. taxicola Dearn. & House—N.Y. (2).
Phomopsis occulta Trav., on twigs. Northeastern States (3).
Phyllosticta taxi Hollós, on needles. Va. (3).
Phyllostictina hysterella (Sacc.) Petr., twig blight. Idaho, Mont., Wash. (1). Conidial stage of *Physalospora gregaria* Sacc. var. *foliorum* Sacc.
Phytophthora cinnamomi Rands, seedling blight. Md., Va. (3).
Polyporus schweinitzii Fr., butt rot. Idaho (1).
Rhizoctonia solani Kuehn, damping-off. Conn. (2,3).
Sphaeropsis sp. (?*Macrophoma taxi* (Berk.) Berl. & Vogl.), twig blight. N.J. (3).
Sphaerulina taxi (Cke.) Mass., needle blight. Calif., Idaho, Oreg., Wash. (1); Oreg. (3).
S. taxicola (Pk.) Berl., leaf and twig blight. N.Y., Pa. (2).
Xenodomus taxi Petr., on needles. Idaho (1).

[19] Sometimes placed in the Podocarpaceae.

THEACEAE

Camellia

C. japonica L., camellia.

Glabrous tree or shrub, cultivated for its handsome foliage and showy flowers, chiefly in the Southeastern and Gulf States and California. *C. sasanqua* Thunb. is included in a few of the reports.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Wash.
Botryosphaeria ribis Gross. & Dug., branch canker. Miss. Conidial and ascigerous stages obtained.
Botrytis cinerea Pers. ex Fr., bud and flower blight, usually following frost. General.
B. cinerea var. *gracilis* Shirai—La. (on *C. sasanqua*).
Cephaleuros virescens Kunze, algal leaf spot. Gulf States.
Cercospora sp., leaf spot. Ga.
Exobasidium camelliae Shirai, leaf and stem gall. Fla., La., Miss., Tex. On both host species.
E. monosporum Sawada, leaf curl. Ala.
Glomerella cingulata (Ston.) Spauld. & Schrenk, dieback, canker; also on leaves. Widespread. Usually reported as *Colletotrichum* sp., *C. gloeosporioides* Penz., or *Gloeosporium* sp. *Colletotrichum camelliae* Mass. reported in Miss.
Hendersonia maculans (Cda.) Lév., on leaves. Ga.
H. subalbicans Ger., leaf spot. Ga.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Macrophoma sp.—Miss.
Macrosporium camelliae Cke. & Mass., on leaves. Ga. Is associated with *Pleospora camelliae* Dippenaar and is probably a *Stemphylium* (?*S. botryosum* Wallr.). On *C. sasanqua*.
Meloidogyne spp., root knot nematodes. Ga., Tex.
Monochaetia camelliae Miles, on leaves. Ga., Miss.
Pestalotia guepini Desm., leaf spot, twig blight. Widespread.
Phomopsis sp., dieback. Fla. Entrance through frozen flowers.
Phyllosticta camelliae West. and *P. camelliaecola* Brun., leaf spot. Southeastern States.
Sclerotinia camelliae Hara, flower blight. Calif., Ga., La., N.C., Oreg.
Septobasidium castaneum Burt—S.C.
S. conidiophorum Couch—S.C.
S. pseudopedicellatum Burt, felt fungus. S.C.
Sphaceloma sp., white scab. Fla., Ga., La. ?*Elsinoë leucospila* Bitanc. & Jenkins.
Sporonema camelliae Earle, leaf spot. Ala., Va.
Ring spot—?virus. La., S.C.
Yellow-spot—undetermined virus. Oreg.
Bud drop—physiogenic; malnutrition, freezing, desiccation. Widespread.
Dieback—physiogenic; malnutrition and freezing. Widespread.
Oedema, scab—corky excresences on leaves, sometimes local collapse and necrosis of leaf tissue. ?Physiogenic, due to disturbed water relations. Occasional in Southeastern States (Va. to Fla. and Tex.) and Calif.
Sunscald—physiogenic, desiccation and freezing.

Franklinia

See *Gordonia*.

Gordonia

G. lasianthus (L.) Ellis, loblolly-bay.

A flowering evergreen shrub. Range 29,30; sometimes planted for ornament. Includes also records for *Franklinia alatamaha* Marsh., a small deciduous tree, formerly native in Georgia, now found only in cultivation as an ornamental.

Cystospora gordoniae Berk., on flower stalks. S.C.
Meliola cryptocarpa Ell. & G.Martin, black mildew. Fla., La.
Mycosphaerella gordoniae (Cke.) J.H.Miller, on leaves. Ga.
Phyllosticta gordoniae Ell. & G.Martin, leaf spot. Fla., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Thea

T. sinensis L. (*Camellia sinensis* (L.) Kuntze), tea.

Evergreen shrub of southeastern Asia, its dried and cured leaves the source of tea; sometimes grown in the South for interest and earlier tested there commercially.

Cephaleuros virescens Kunze, green scurf, algal leaf spot. Fla., S.C.
Glomerella cingulata (Ston.) Spauld. & Schrenk, on leaves. Fla., S.C., Tex. *Colletotrichum camelliae* Mass. and problably *C. carveri* Ell. & Ev. belong to this.
Guignardia camelliae (Cke.) Butl., on leaves. Calif.
Pestalotia guepini Desm., leaf spot, twig blight. S.C.
Phyllosticta erratica Ell. & Ev., on leaves. Ala.
Sphaceloma sp.—La.

THEOPHRASTACEAE

Jacquinia

Jacquinia spp.

Tropical evergreen shrubs or trees of the West Indies to southern Florida and tropical America generally.

Asterella paupercula (Ell. & Ev.) Sacc., black spot. Fla.
Dimerina jacquiniae Garman—P.R.
Lizonia jacquiniae Briard & Har., black spot. V.I.
Phyllachora conspicua Ferd. & Winge, black spot. V.I.
P. inclusa (Berk. & Curt.) Sacc.—P.R.

THYMELEACEAE

Daphne

Daphne spp.

Ornamental shrubs, natives of Europe and Asia, cultivated in zone 5 and southward; *D. mezereum* L. is locally naturalized in range 26,27.

Botrytis sp., twig blight. Northeastern States, Pacific Northwest.
Fusarium sp., dieback, wilt. N.J.
Gloeosporium mezerei Cke., leaf spot, leaf drop. Wash.
Nectria cinnabarina Tode ex Fr., on twigs. N.J.
Phytophthora sp., collar rot. N.Y.
P. cactorum (Leb. & Cohn) Schroet.—Calif.
Rhizoctonia solani Kuehn, stem rot. N.Y.
Sclerotium rolfsii Sacc., wilt, stem rot. Fla.

Daphnopsis

Daphnopsis spp.

Small trees of the West Indies.

Irene aibonitensis (F.L.Stevens) Toro, black mildew. P.R.

Dirca

D. palustris L., leatherwood, wicopy, ropebark. A shrub with very tough and fibrous bark. Range 22,23,24,25,27,28,29.

Aecidium hydnoideum Berk. & Curt.: See *Puccinia extensicola* var. *hydnoidea*.

Gloeodes pomigena (Schw.) Colby, on twigs. Ind.

Puccinia extensicola Plowr. var. *hydnoidea* (Berk. & Curt.) Arth. (I), rust. Maine to Minn. and Mo.; Ala. II and III on *Carex pensylvanica* Lam.

TILIACEAE

Tilia

(1) *T. americana* L., American linden, basswood.

Forest tree of range 20,21,22,23,24,25,26,27; grown for shade and ornament, zone 2; its flowers are small and fragrant; valuable as a honey plant. A few records on closely related host species, occurring mostly in the South and often not specifically distinguished, are included.

(2) *T. cordata* Mill. (also in part *T. europea* L. [=*T. cordata* × *T. platyphyllos* Scop.]), European linden.

Large tree of Europe, extensively planted for shade, zone 3.

Aleurodiscus acerinus (Pers. ex Fr.) Hoehn. & Litsch. and *A. griseo-canus* (Bres.) Hoehn. & Litsch., on bark, ?canker. Pa., Iowa, Mo. (1).

Asteroma tiliae Rud., on leaves. Ind., Wis. (1).

Botryosphaeria sp., trunk and branch canker. Md. (on *T. neglecta* Spach.) .

B. ribis Gross. & Dug., on branches. Md., N.J., N.Y. (1).

Cercospora microsora Sacc., leaf blight, leaf spot. General (1); N.J., Pa., Va. (2). ?Conidial stage of *Mycosphaerella microsora* Syd.

Collybia velutipes Fr., sapwood rot, wound rot. Occasional (1).

Daedalea confragosa Bolt. ex Fr., white spongy rot, wound rot. Vt. (1).

D. unicolor Bull. ex Fr.—Iowa, N.Dak. (1).

Daldinia concentrica (Bolt.) Ces. & de N., wood rot. Minn., N.Y. (1).

D. grande Child and *D. occidentale* Child—Minn. (1).

Dendrophoma tiliae Pk., on branches. N.Y. (1).

Diaporthe eres Nits. (*D. velata* Pers. ex Nits.), on branches. Mich. (1).

D. tiliacea (Ell.) Hoehn., on branches. Iowa, Maine, Mich., N.Y., Pa. (1).

Eutypella stellulata (Fr.) Sacc.—Okla. (1).

Exosporium tiliae Lk. ex Fr., on branches. N.Y. to Va. and Mich. (1).

Fomes applanatus (Pers. ex Fr.) Gill., white butt and heart rot. Vt. (1).

F. connatus (Weinm. ex Fr.) Gill., white spongy rot. Northeastern States (1).

F. geotropus Cke.—Fla. (1).

F. pinicola (Sw. ex Fr.) Cke., brown cubical rot. N.Y. (1).

F. populinus (Schum.) Cke.—Fla. (1).

Gloeosporium tiliae Oud., leaf spot. N.Y. (2). Conidial stage of *Gnomonia tiliae*, q.v.

Gnomonia tiliae Kleb., leaf spot. Conn. to Va., Iowa, and Minn., Tex. (1).

Haplosporella tiliaceae (Pk.) Peter.—N.Y.

Hydnum septentrionale Fr., white spongy rot. Ala., Mich., Tex. (1).

Lenzites betulina L. ex Fr., wood rot. N.Y., Vt. (1).

Macrophoma tiliacea Pk., on branches. Ohio, Okla. (1).

Melanconis juglandis (Ell. & Ev.) Graves var. *tiliae* Wehm., on branches. Mich. (1).

M. tiliacea (Ell.) Ell. & Ev.: See *Diaporthe tiliacea*.

Microsphaera alni DC. ex Wint., powdery mildew. Minn. (1).

Mycosphaerella microsora Syd.—Iowa (1).

Myxosporium fumosum Ell. & Ev., on dead twigs. Ill. (1).

M. tiliae Dearn. — N.Y. (1). Possibly identical with *Myxofusicoccum tiliae* Died. and related to *Diaporthe tiliacea*.

Nectria spp., especially *N. coccinea* Pers. ex Fr. and *N. galligena* Bres., on trunks and branches. N.Y., Pa., Va. (1). Only *N. galligena* causes trunk cankers.

N. cinnabarina Tode ex Fr., on branches, dieback. Widespread (1).

Phlyctaena tiliae Dearn., leaf spot. Tenn. (1).

Pholiota adiposa Fr., brown-mottled heart rot. Mass., Pa. to Tenn. (1).

Phoradendron flavescens (Pursh) Nutt., mistletoe. Southern States, Tex. (1).

Phyllactinia guttata (Fr.) Lév. (*P. corylea* DC. ex Karst.), powdery mildew. Minn. (1).

Phyllosticta praetervisa Bub., leaf spot. Wis. (1).

P. tiliae Sacc. & Speg.—N.Y. to W.Va. (1).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).

Physalospora obtusa (Schw.) Cke., on branches. N.Y., Va. (1).

Pleurotus ostreatus Fr. and *P. sapidus* Kalch., sapwood rot, sometimes on living trees. Cosmopolitan (1).

Polyporus spp., wood rot, chiefly of dead trunks, sometimes heart rot of living trees. Species reported include:

P. adustus Willd. ex Fr.—Minn., Mo., N.Y., Vt., Wis. (1);
P. biformis Klotzsch—N.Y. (1);
P. elegans Bull. ex Fr.—Mo., N.Y., Ohio (1);
P. fumosus Pers. ex Fr.—N.Y. (1);
P. galactinus Berk.—Minn. (1);
P. gilvus Schw. ex Fr.—(1);
P. hirsutus Wulf. ex Fr.—Mass., N.Y., Vt. (1);
P. pargamenus Fr.—N.Y., Vt. (1);
P. resinosus Schrad. ex Fr.—Minn., N.Y., Vt. (1);
P. spumeus Sow. ex Fr.—N.Y. (1);
P. squamosus Huds. ex Fr.—(1);
P. unitus Pers.—Mich. (1);
P. versicolor L. ex Fr.—Ind., Vt. (1).

Rabenhorstia tiliae Fr., on branches. Iowa, Maine, N.C. (1).

Russula sp., parasitic mycorrhiza. Mich. (1).

Schizophyllum commune Fr., wood rot. Minn. (1).

Sclerotinia tiliae Reade (=*Ciboria tiliae* (Reade) Buchw.), on fallen fruits. Iowa (1).

Septobasidium fumigatum Burt, felt fungus. Fla. (1).

Sphaerella incanescens Schw. ex Cke., on leaves. ?Pa. (on *T. neglecta*).

Sphaeropsis sp., leaf spot. Okla. (1).

Stereum spp., wood rot, chiefly of logs and slash. Species reported include: *S. cinerascens* (Schw.) Mass. —Iowa, Minn. (1); *S. fasciatum* Schw. ex Fr.—Vt. (1); and *S. murrayi* (Berk. & Curt.) Burt—Pa. (1).

Strumella sp. (*?S. coryneoidea* Sacc. & Wint.), trunk canker. N.J. (1).
Torula ligniperda (Willk.) Sacc., gray sapwood stain. (1).
Trametes mollis Sommerf. ex Fr., wood rot. Vt. (1).
Uncinula clintonii Pk., powdery mildew. General (1).
Ustulina vulgaris Tul., root rot. N.Y. (1).
Valsa ambiens Pers. ex Fr., on dead twigs. N.Y. (1).
Verticillium albo-atrum Reinke & Berth., wilt. Ill. (1).

TROPAEOLACEAE

Tropaeolum

(1) *T. majus* L., garden nasturtium.

A tender herb of South America grown in a variety of horticultural forms as an annual in warm seasons, or under glass; a popular garden flower.

(2) *T. peregrinum* L., canarybirdflower.

An herb of similar origin and habit; also grown for ornament.

?Alternaria sp., leaf spot. N.J., Ohio (1). SEE ALSO *Pleospora* sp.
Botrytis cinerea Pers. ex Fr., gray mold. Alaska (1).
Cercospora tropaeoli Atk., leaf spot. Ala., Tex. (1).
Corynebacterium fascians (Tilford) Dows., fasciation. Calif.
Cuscuta sp., dodder. Mo., N.H. (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
H. schachtii Schmidt, root gall. ?(1).
Heterosporium tropaeoli T. Bond, leaf spot, stem rot. Severe in Calif.; seen also in N.Y. Seedborne.
Meloidogyne spp., root knot nematodes. N.J., Tex., T.H. (1).
Pleospora sp. (*?P. herbarum* (Pers. ex Fr.) Rab.), leaf spot. Miss., N.J., Ohio (1). The conidial stage, *Stemphylium* sp., has also been reported as *Alternaria*.
Pseudomonas aptata (Brown & Jamieson) F.L.Stevens, leaf spot. Maine, Minn., Miss., N.J., Pa., Tex., Va. (1).
P. solanacearum E.F.Sm., bacterial wilt. Fla., Md., N.C., N.J., Va. (1). An undetermined bacterial wilt also reported from Wash. (1).
Puccinia aristidae Tracy (O,I), rust. Utah (1). II and III on *Aristida* and *Distichlis* spp.
Xanthomonas solanacearum (E.F.Sm.) Dows.: SEE *Pseudomonas solanacearum*.
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1,2), Tex. (1).
SPOTTED WILT—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Md., Tex. (1).
YELLOWS—western aster yellows virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif.

TURNERACEAE

Turnera

T. ulmifolia L.

A shrub of tropical America.

Cercospora turnerae Ell. & Ev., leaf spot. P.R.

TYPHACEAE

Typha

(1) *T. angustifolia* L.

(2) *T. latifolia* L., cattail.

Perennial herbs of marshlands distributed throughout temperate North America; grown in aquatic gardens for ornament; the leaves used in basketry and the dried fruiting spikes in floral arrangements; sometimes called "reeds;" the inflorescences and rootstocks also furnish food for wildlife.

Cladosporium spp., leaf mold. General. Usually reported as *C. typharum* Desm. Also reported as *C. fasciculatum* Cda., *C. herbarum* Lk. ex Fr., and *C. typhae* Schw.; perhaps not distinct.
Cryptomela typhae (Pk.) Died., on culms and leaves. N.Y. (1,2), Mass. (2). Also reported as *Fusella typhae* Lindau and *Melanconium typhae* Pk.
Didymosphaeria typhae Pk., on culms. N.Y. (2).
Gloeosporium sp.—Mass. (1).
Guignardia sp.—Ga. (2).
Hendersonia typhae Oud. (=*?Stagonospora typhoidearum* (Desm.) Sacc.), on leaves. Wis. (1).
Heterosporium maculatum Klotzsch ex Cke. (=*?H. typharum* Cke. & Mass.), on leaves. Colo., Mo., N.Dak. (2).
Hymenopsis hydrophila Sacc., on leaves. N.Y. (2).
Leptosphaeria spp., on culms and leaves. Species reported include: *L. hydrophila* Sacc.—N.Y. (1); *L. luctulosa* Niessl—Mo. (2); *L. typharum* (Desm.) Karst. (*L. typhae* Karst.)—Mo., Mont., N.Y. (2).
Leptothyrium typhina Dearn. & House, on culms. N.Y. (2).
Lophodermium typhinum (Fr.) Lambotte, on leaves. Ga., N.Y. (2).
Mycosphaerella typhae (Lasch) Lindau, on leaves. Ga., Md., N.Dak., N.Y., Pa. (2). Also reported as *Phaeosphaerella typhae* (Lasch) Petr.
Ophiobolus sp. (*?O. typhae* Feltg.), culm rot. Ark. (2).
Phoma orthosticha Ell. & Ev., on leaves. Maine (2). Probably =*P. typharum* Sacc. or *Phyllosticta typharum* (Sacc.) Allesch., the conidial stage of *Leptosphaeria typharum*, q. v.
Phyllosticta typhina Sacc. & Malbr. (*P. renouana* Sacc. & Roum.), leaf spot. Nebr., N.Y., Oreg., Tex., Wis. (2).
Pleospora typhae Pass., on leaves. Calif. (2).
Pythiogeton autossytum Drechs., leaf rot. Ohio (2).
Pythium helicoides Drechs., leaf rot. Ohio (2).
Sclerotium hydrophilum Sacc., on culms. Ark. (2).
Scolecotrichum typhae Ell. & Ev., leaf spot. Colo. (2).
Stagonospora typhoidearum (Desm.) Sacc., leaf spot. Tex., Wis. (2).
Typhula latissima Remsberg, on dead culms. N.Y. (2).

ULMACEAE

Celtis, hackberry, nettletree

(1) *C. laevigata* Willd., sugarberry, southern hackberry.

Tall tree of range 11,16,17,20,22,25,29,30. Included here also are records for minor *Celtis* spp. of the southern United States.

(2) *C. occidentalis* L., hackberry.

Large or small tree to low shrub, depending on habitat. Range 15,16,18,20,21,22,23,24,25,26, 27,28,29,30. Included here are records for minor *Celtis* spp. of western and southwestern United States.

Alternaria antennaeforme (Berk. & Curt.) Elliott—Tex. (=?*Macrosporium*).

Armillaria mellea Vahl ex Fr., mushroom root rot. Tex. (1); occasional (2).

Camarosporium celtidis Ell. & Ev., on branches. Kans. (2).

Cercospora spegazzinii Sacc., on leaves. Iowa (2). Differs in description from *Cercosporella celtidis*.

Cercosporella celtidis (Ell. & Kell.) J.J.Davis, leaf spot. Ala., Tex. (1); Central States to Tex. (2).

Corticium stevensii Burt: See *Pellicularia koleroga*.

Cucurbitaria celtidis Shear, on dead branches. Kans. (2).

Cylindrosporium celtidis Earle, leaf spot. Ala., Tex. (1).

C. defoliatum Heald & Wolf, leaf blight. Tex. (1,2).

Cytospora celtidis Ell. & Ev., on branches. Kans., W.Va. (2).

Daedalea spp., wood rot, occasionally on living trees. Species reported include: *D. ambigua* Berk., *D. confragosa* Bolt. ex Fr., *D. repanda* Pers. ex Fr., *D. unicolor* Bull. ex Fr.

Didymella celtidis Berk. & Cke., on branches. S.C. (1).

Didymosphaeria celtidis Schw., on dead branches. Kans. (2).

Dinemasporium decipiens Sacc. and *D. radiatum* Ell. & Ev., on dead twigs. Kans., Pa. (2).

Diplodia celtidigena Ell. & Barth., on dead branches. Kans., Mo. (2).

Dothiorella celtidis Pk., on dead twigs. N.Y. (2).

Fomes geotropus Cke. and *F. marmoratus* (Berk. & Curt.) Cke., butt rot, heart rot. Southern States (1).

Ganoderma lucidum (Leyss. ex Fr.) Karst., butt rot. Southern States (1).

Gloeosporium celtidis Ell. & Ev., on leaves. Nebr. (2).

Haplosporella celtidis Ell. & Ev., on branches. W.Va. (2).

Helicobasidium purpureum (Tul.) Pat. (*Rhizoctonia crocorum* (Pers.) DC.), seedling blight. Tex. (1).

Helicoceras celtidis (Biv.-Bernh.) Linder, on leaves. Ark., Kans., Mo. (2).

Hendersonia celtidis Ell. & Ev., on dead twigs. Pa., Ill., N.J. (2).

H. celtifolia Cke., on leaves. (2).

Hydnum erinaceus Bull. ex Fr.—(1).

Hypoxylon rubiginosum Pers. ex Fr.—Ga. (1).

Lentinus tigrinus Fr.—(1).

Macrophoma celtidicola Dearn. & House—Mo., Nebr. (2).

Macrosporium antennaeforme Berk. & Curt., on leaves. Ala. (1); Mo., W. Va. (2). See also *Alternaria antennaeforme*.

Melanconium celtidis Ell. & Ev., on dead branches. Kans. (2).

Mycosphaerella maculiformis (Pers. ex Fr.) Schroet., on fallen leaves. Kans. (2).

Myxosporium ulmi (Oud.) Sacc., on branches. Tex. (2).

Pellicularia koleroga Cke., thread blight. Fla. (1).

Phleospora celtidis Ell. & Morg., leaf spot. Mass. to Mo. and Kans. (2).

Phoradendron engelmani Trel., mistletoe. Southeastern and Gulf States (1).

P. flavescens (Pursh) Nutt., mistletoe. Southeastern and Gulf States (1); Va. to Mo. and Tex. (2).

Phyllosticta celtidis Ell. & Kell., leaf spot. Tex. (1), general (2).

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1); Okla., Tex. (2) [resistant].

Physalospora fusca N. E. Stevens, on dead branches. Occasional (1).

P. obtusa (Schw.) Cke., on dead branches. Occasional (1, 2).

Placosphaeria celtidis Dearn. & House, on twigs. N.Y. (2).

Pleurotus ostreatus Jacq. ex Fr., on fire-scarred trees. La., Miss.

Polyporus spp., wood rot, occasionally on living trees. Widespread but reported mostly from the lower Mississippi Valley (1). Species reported include: *P. adustus* Willd. ex Fr., *P. cuticularis* Bull. ex. Fr., *P. hirsutus* Wulf. ex Fr., *P. pargamenus* Fr., *P. robiniophilus* (Murr.) Lloyd, *P. sulphureus* Bull. ex Fr., *P. versicolor* L. ex Fr., and *P. zonalis* Berk.

P. tulipiferus (Schw.) Overh., sapwood rot, wound rot. Minn. (2).

Portia ambigua Bres., root rot. Tex. and lower Mississippi Valley (1).

Pseudoperonospora celtidis (Waite) G. W. Wils., downy mildew. Ga. (1), Md. (1,2).

Ramularia celtidis Ell. & Ev.: See *Cercosporella celtidis*.

Rosellinia caespitosa Ell. & Ev., on dead branches. Kans. (2).

Septobasidium burtii Lloyd, felt fungus canker. Tex. (1,2).

S. sydowii Couch—Tex. (1).

Septogloeum celtidis Dearn., leaf spot. N.Y. (2).

Septoria sp., leaf spot. Tex. (1).

S. gigaspora Ell. & Ev.: See *Phleospora celtidis*.

Sphaeropsis celtidis Ell. & Ev., on dead branches. Kans. (2).

Sphaerotheca phytophila Kell. & Swingle, powdery mildew, witches'-broom. Fla. (1); Central States to Kans. and Okla. (2). Associated with gall mites, (*Eriophyes* sp.)

Stereum bicolor Pers. ex Fr., wood rot. Cosmopolitan (1).

S. purpureum (Pers. ex Fr.) Fr.—Okla. (1).

Thelephora retiformis Berk. & Curt.: See *Septobasidium burtii*.

?Thyronectria pyrrhochlora (Auers.) Sacc.—Ga. (on *C. georgiana* Small).

Tryblidiella rufula (Spreng.) Sacc.—Ala. (1).

Uncinula macrospora Pk., powdery mildew. Fla., Ga. (on *C. georgiana*).

U. parvula Cke. & Pk., powdery mildew. Widespread (1).

U. polychaeta (Berk. & Curt.) Ell., powdery mildew. Southeastern States, Tex. (1); Southern States (2).

Valsa celtidis Cke., wood rot. Okla. (1).

Planera

P. aquatica (Walt.) J. F. Gmel., planertree, water-elm.

A small deciduous tree of range 20,25,29,30.

Daedalea ambigua Berk., wood rot. S.C.

Ganoderma lucidum (Leyss. ex Fr.) Karst., wood rot.

Ulmus, elm

Ulmus alata Michx.: See *U. thomasi.*

Ulmus americana L., American elm.

Tall, wide-spreading, well-known ornamental tree of range 15 to 30, inclusive, excepting range 17 and 24; widely grown for shade and especially as a street tree from New England to the Gulf States and the Great Plains.

Aleurodiscus griseo-canus (Bres.) Hoehn. & Litsch. and *A. oakesii* (Berk. & Curt.) Cke., on bark of trunks and branches. Iowa, Mo., N.Y.

Aphelenchoides fragariae (Ritz.-Bos) Christie, on cankered twig. N.J.

Apioporthe apiospora (Ell. & Holw.) Wehm., twig canker. Iowa.

Armillaria mellea Vahl ex Fr., mushroom root rot. Mo.

Botryodiplodia hypodermia (Sacc.) Petr. and *B. ulmicola* (Ell. & Ev.) Buis.: See *Sphaeropsis ulmicola.*

Botryosphaeria ribis Gross. & Dug., stem canker on seedlings. Ga.

Camarops microspora (Karst.) Shear, on branches. Alaska, Idaho, N.Y.

Carpenterella molinea Tehon & Harris, inhabiting xylem tissues, ?parasitic in trachea. Wis.

Cephalosporium sp.: See *Dothiorella ulmi.*

Ceratostomella ulmi Buis. (*Graphium ulmi* Schwarz), Ceratostomella wilt [Dutch elm disease].[20] New England States to Virginia, west to Ind. and Ill.; Colo.

Cercospora sphaeriaeformis Cke., leaf spot. La., Tex.

Collybia velutipes Fr., brown heart rot, wound rot. Widespread.

Coniothyrium spp., twig canker, dieback. Ill., Mass., Mich., Wis.

C. radicicola Tehon, in moribund roots. Ohio.

Coryneum tumoricola Pk., leaf spot. N.Y.

Cylindrosporium ulmicola Ell. & Ev., conidial stage of *Mycosphaerella ulmi*, q.v.

Cytospora spp., probably mostly *C. ambiens* Sacc. (=*Valsa ambiens*, q.v.) on dead twigs; secondary in various forms of dieback. Widespread.

C. carbonacea Fr.—Mass., Tex. Conidial stage of *Cryptosporella hypodermia* (Fr.) Sacc.

C. chrysosperma Pers. ex Fr.: See *Valsa sordida.*

Cytosporina ludibunda Sacc., twig canker, dieback. Ill., Kans.

Daedalea confragosa Bolt. ex Fr., white-mottled rot. Widespread.

D. unicolor Bull. ex Fr., butt rot, trunk canker. N.Y., Vt.

Daldinia concentrica (Bolt. ex Fr.) Ces. & de N., wood rot. Widespread.

Diaporthe eres Nits. (*D. ulmicola* Ell. & Ev.), on branches. Mich., Okla. Also reported in the conidial stage as *Phomopsis (Phoma) oblonga* (Desm.) Hoehn.

Diplodia spp., on dead twigs. In part *D. ulmi* Dearn., on twig cankers in Ill.; and also *Botryodiploda ulmicola* (Ell. & Ev.) Buis., for which see *Sphaeropsis ulmicola.*

Dothidella ulmea (Schw.) Ell. & Ev.: See *Gnomonia ulmea.* This name is confused with *D. ulmi* (Duv.) Wint., a synonym of *Systremma ulmi* (Schleich.) Th. & Syd., not known to occur in our range.

Dothiorella ulmi Verrall & May (*Cephalosporium* sp.), dieback, wilt. Reported from Conn. to Va., Okla., and Mont.; probably general throughout range of the host. According to Goidanich, this is a *Deuterophoma*, =*D. ulmi* (Verall & May) Goid. & Ruggieri.

Endothia gyrosa Schw. ex Fr., on branches and exposed roots. Ga.

Eutypella spp., including *E. scoparia* (Schw.) Ell. & Ev., *E. stellulata* (Fr.) Sacc., *E. tumida* (Ell. & Ev.) Wehm., on dead branches. Colo., D.C., Del., Ga., Ill., Ky., Md., Mo., N.Y., Ohio, R.I., Tenn., Vt.

Fomes spp., as reported on *Ulmus*. Records include: *F. fraxineus* (Bull. ex Fr.) Cke.; *F. fraxinophilus* (Pk.) Sacc.; *F. geotropus* Cke. (*?F. ulmarius* Sow. ex Fr.)—Fla. to La. and Ark.; *F. marmoratus* (Berk. & Curt.) Cke.—Tex.; and *F. scutellatus* Schw. ex Cke.—Va.

F. applanatus (Pers. ex Fr.) Gill., white-mottled butt rot. Maine, Mich., N.Y., Ohio.

F. connatus (Weinm. ex Fr.) Gill., white spongy rot. New England States.

F. igniarius (L. ex Fr.) Kickx, white spongy heart rot. New England, Wis.

Fusarium spp., on bark or in wood of blighted twigs. Conn., Ill., Mass. Species reported include: *F. oxysporum* Schlecht., *F. scirpi* Lamb. & Fautr. var. *compactum* Wr.

Ganoderma curtisii (Berk.) Murr. and *G. sessile* Murr., white spongy heart and sapwood rot. N.Y., Ohio.

Gloeosporium inconspicuum Cav., leaf spot, twig blight. Mass. to Va., Okla., and Minn. The name "anthracnose" has been applied to this leaf spot and also to leaf spots caused by the two following fungi. Since the *Gnomonia* spot is more generally called "black spot," and that caused by *Gloeosporium ulmicola* is a different type of spot, the term "anthracnose," if used at all, should preferably be restricted to *G. inconspicuum.*

G. ulmeum Miles: See *Gnomonia ulmea.*

G. ulmicola Miles, leaf spot. Conn., Ill., Ind., Wis.

Gnomonia ulmea (Schw. ex Fr.) Thuem. (*Gloeosporium ulmeum* Miles), black spot. General.

Graphium ulmi Schwarz: See *Ceratostomella ulmi.*

Helicobasidium purpureum Pat., root rot. Tex.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Lenzites betulina L. ex Fr., wood rot. Ind., Mass., Md.

Macrophoma ulmicola Ell. & Ev.: See *Sphaeropsis ulmicola.*

Marasmius spp., on outer bark of living trees. Occasional.

Melanconis sudans (Berk. & Curt.) Wehm., on branches. Mich., Pa.

Melasmia ulmicola Berk. & Curt., on leaves. N.J. Said to be the conidial stage of *Rhytisma ulmi* Fr., which was apparently applied to a sterile leaf spot.

Meloidogyne spp., root knot nematodes. Okla., Tex.

Microsphaera alni DC. ex Wint., powdery mildew. Ill., Iowa, Miss., Ohio.

Mycosphaerella ulmi Kleb. (*Phleospora ulmi* (Fr.) Wallr.), leaf spot. Mass. to Ala., Kans., and Wis., chiefly on *U. campestris* Mill.

Myxosporium hypodermium Sacc.: See *Sphaeropsis ulmicola.*

Nectria cinnabarina Tode ex Fr., on twigs, coral spot. Widespread.

N. coccinea Pers. ex Fr., branch and trunk canker. Mass., N.J., N.Y.

[20] It is unfortunate that the term "Dutch elm disease" is employed in American usage as the common name for so widely-known a disease. Its use erroneously imputes that the disease originated in the Netherlands or owes its introduction into the U. S. from that country. This came about, no doubt, from the fact that the disease was first described in the Netherlands [Schwarz, Marie B. Das Zweigsterben der Ulmen, Trauerweiden und Pfirsichbaume. (The dying of twigs of elm, weeping willow and peach). Phytopath. Lab. "Willie Commelin Scholten," Meded. Baarn, 5: 74 pp. 1922. See pp. 1-32, 68-74. (Rev. Appl. Mycol. 2:92-94)]. Later, M. Wilson of England [Wilson, M. The Dutch elm disease. Gard. Chron., Ser. 3, 81:133-134. 1927] referred to it as the "Dutch elm disease." Although this term is nondescriptive of the wilt caused by *Ceratostomella ulmi* and some current phytopathological indexes avoid its use, the term, nevertheless, has persisted and is widely used in the United States.

N. galligena Bres., trunk canker. Alleghany region.
Nummularia clypeus (Schw.) Cke., and *N. repanda* (Fr.) Nits., on branches. Ind., Kans., Mo., Nebr., Wis.
Phleospora ulmi (Fr.) Wallr.: See *Mycosphaerella ulmi.*
Phoma sp., twig canker. Ill.
P. cincta Berk. & Curt., on leaves. S.C.
Phomopsis sp. *(?P. oblonga* (Desm.) Hoehn.), twig canker, dieback. New England States to S.C., Ill., and Minn. Conidial stage of *?Diaporthe eres,* q.v.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Ind., Tex.
Phyllactinia guttata (Fr.) Lév. *(P. corylea* Pers. ex Karst.), powdery mildew. N.C. to Tex. and Iowa.
Phyllosticta confertissima Ell. & Ev., leaf spot. Pa.
P. erratica Ell. & Ev.—Ala., Tex.
P. melaleuca Ell. & Ev.—Mass. to Ala., Okla., and Wis. Reported sometimes as *P. ulmicola* Sacc.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora fusca N.E.Stevens, on branches. Ala.
P. obtusa (Schw.) Cke.—Conn., Ga., Iowa, Kans.
Phytophthora cactorum (Leb. & Cohn) Schroet., bleeding canker. ?R. I.
P. inflata Caroselli & Tucker, pit canker on trunks. Conn., Mass., N.Y., Pa.
Pleurotus ostreatus Jacq. ex Fr., white sapwood rot, wound rot. Widespread.
P. ulmarius Bull. ex Fr., brown ring rot, wound rot. Widespread.
Polyporus spp., wood rot chiefly of dead trunks and logs, sometimes heart rot of living trees, especially the following:
P. admirabilis Pk.—N.Y.
P. adustus Willd. ex Fr., white mottled heart rot. Ind., N.Y., Va., Wis.
P. conchifer (Schw.) Fr., on dead twigs and branches. Widespread.
P. delectans Pk.—N.Y.
P. dryadeus Pers. ex Fr.—N.Y.
P. fragrans Pk.—Ind., Ohio.
P. frondosus Dicks. ex Fr.—Conn., Ohio.
P. fumosus Pers. ex Fr.—Mass., N.Y., Wis.
P. galactinus Berk.—Maine, N.Y.
P. gilvus (Schw.) Fr.—N.Y., Wis.
P. hirsutus Wulf. ex Fr.—Mo., N.Y.
P. lacteus Fr.—N.Y.
P. resinosus Schrad. ex Fr.—Maine, Va.
P. spumeus Sow. ex Fr., white sapwood rot, wound rot. N.Y., Ohio.
P. squamosus Huds. ex Fr., white spongy heart rot. Northeastern and North Central States.
P. sulphureus Bull. ex Fr.
P. tulipiferus (Schw.) Overh.—N.Y.
P. unitus Pers.—Mich.
P. versicolor L. ex Fr.—N.Y. Associated with "dote," a brown pocket discoloration or decay of timber.
Prosthecium ulmi Wehm., on branches. Mich.
Rhizoctonia crocorum Pers. ex DC.: See *Helicobasidium purpureum.*
R. solani Kuehn, damping-off. Cosmopolitan, reported especially in nurseries in the Great Plains States.
Rhytisma ulmi Fr.—Reported from Minn., N.J., Pa.; all apparently based on sterile material or confused with *Gnomonia ulmea,* q.v.
Sacidium ulmi-gallae Kell. & Swingle, on leaf galls. Kans., Tex., Wis.
Schizophyllum commune Fr., wood rot. Cosmopolitan.
Septobasidium pseudopedicellatum Burt, brown felt. N.C.
Septogloeum parasiticum Kauffm. & Dearn., twig blight. Mich.
S. profusum (Ell. & Ev.) Sacc., leaf spot. Ill., Miss.
S. ulmi Briosi & Cav.: See *Mycosphaerella ulmi.*
Sphaeropsis sp., especially *S. ulmicola* Ell. & Ev., twig canker, dieback. Conn. to Miss., Okla., and Wis. This has been called *Botryodiplodia hypodermia* (Sacc.) Petr. (1923) and *B. ulmicola* (Ell. & Ev.) Buis. (1931); *Macrophoma ulmicola* Ell. & Ev. is also a synonym. If it is correctly placed in *Sphaeropsis* and the American and European forms are the same, the proper combination is *S. hypodermia* (Sacc.) Hoehn. No ascigerous stage is known.
S. ulmea Ell. & Barth.: See *Physalospora obtusa.*
Stereum spp., wood rot. Species reported include *S. cinerascens* (Schw.) Mass.; *S. fasciatum* Schw.—Okla.; *S. purpureum* Pers. ex Fr.; and *S. subpileatum* Berk. & Curt.
Taphrina ulmi (Fckl.) Johans., leaf blister. Conn. to Miss., Okla., and Wis.
Thyronectria chlorinella (Cke.) Seeler—Ala., N.C.
T. chrysogramma Ell. & Ev.—Kans.
Uncinula macrospora Pk., powdery mildew. General.
Ustulina vulgaris Tul., white sapwood rot. Md.
Valsa ambiens Pers. ex Fr., on dead twigs. Widespread.
V. sordida Nits. *(Cytospora chrysosperma* Pers. ex Fr.) —Minn.
Verticillium sp. *(?V. albo-atrum* Reinke & Berth.), wilt, dieback. Maine to Va. and Wis.; Oreg.
V. rhizophagum Tehon, on roots. Ohio. Probably secondary, on trees injured by phloem necrosis.
Xylaria spp., including *X. hypoxylon* L. ex Grev., *X. mali* Fromme, *X. polymorpha* Pers. ex Grev., root rot (secondary). Ill., Miss., Va.
MOSAIC (infectious chlorosis, mottle leaf)—virus. Ill., Iowa, Kans., Ky., Mich., Mo., N.J., Ohio, Okla.; other reports, based on similarity of symptoms, from Conn. to Va.; probably present throughout the range of *U. americana.*
PHLOEM NECROSIS—elm phloem-necrosis virus *(Morsus ulmi* Holmes). ?Ala., Ark., Ill., Ind., Iowa, Kans., Ky., Miss., Mo., Nebr., Ohio, Okla., Tenn., and W. Va.
SLIME FLUX—physiological; associated with wet soil, mechanical injuries to roots, collar, and crotches, and to frost cracks; frequent on lawn and street trees.

Ulmus campestris Mill.: See *U. procera.*
Ulmus carpinifolia Gleditsch: See *U. procera.*
Ulmus crassifolia Nutt., cedar elm.

Tree with spreading limbs and slender branches, sometimes shrubby. Range 17,20,29, 30; wood used commercially and cultivated for shade, zone 7.

Cylindrosporium tenuisporum Heald & Wolf, leaf spot. Tex.
Diplodia sp. (*?D. ulmi* Dearn.), on twigs. Tex.
Gnomonia ulmea (Schw. ex Fr.) Thuem., black spot. La., Miss., Tex.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Septobasidium sydowii Couch, brown felt. Tex.
Uncinula macrospora Pk., powdery mildew. Tex.

Ulmus glabra Huds.: See *U. procera.*
Ulmus hollandica Mill.: See *U. procera.*
Ulmus parviflora Jacq.: See *U. pumila.*
Ulmus procera Salisb. (*U. campestris* Mill.), English elm.

Large tree of England and western Europe, long cultivated for shade, especially in the Northeastern States, and occurring in a number of varieties including yellow- and purple-

leaved types. Records for several other European elms, such as *U. carpinifolia* Gleditsch, smooth-leaved elm, *U. glabra* Huds., Scotch elm, and *U. hollandica* Mill., Dutch elm (a group of hybrids between *carpinifolia* and *glabra*), are included; these species are cultivated for shade in zones 4 and 5.

Ceratostomella ulmi Buis., Ceratostomella wilt [Dutch elm disease]. Conn., N.Y.
Coniothyrium ulmi Tharp, leaf spot. Tex.
Gloeosporium inconspicuum Cav., leaf spot. Mass.
Gnomonia ulmea (Schw. ex Fr.) Thuem., black spot. N.J.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes.
Mycosphaerella ulmi Kleb., leaf spot. Conn., N.Y.
Nectria cinnabarina Tode ex Fr., on twigs, coral spot. Mass., N.J., N.Y.
Phomopsis oblonga (Desm.) Hoehn., twig blight. Mass.
Phyllactinia guttata (Fr.) Lév. (*P. corylea* Pers. ex Karst.), powdery mildew, N.C.
Phyllosticta melaleuca Ell. & Ev., leaf spot. Vt.
Sphaeropsis ulmicola Ell. & Ev., twig canker. Pa.
Taphrina ulmi (Fckl.) Johans., leaf blister. Mass., Wis.
Verticillium albo-atrum Reinke & Berth., wilt. Conn., Mass., N.J., N.Y.

Ulmus pumila L., Siberian, or dwarf, elm.

A graceful, small, hardy tree of eastern Siberia and China, cultivated for shade, especially as a street tree in dry parts of zone 4. Included here also are records for *U. parvifolia* Jacq., Chinese elm, a small tree or shrub of eastern Asia, grown for ornament, zone 5.

Botryosphaeria ribis Gross. & Dug., branch canker. Ark.
Ceratostomella ulmi Buis., Ceratostomella wilt [Dutch elm disease]. N.Y.
Chalaropsis thielavioides Peyronel, seedling root rot. N. Dak. to Okla. and Wyo.; N.J., N.Y.
Coniothyrium ulmi Tharp, leaf spot. W.Va.
Cytospora sp. (*?C. chrysosperma* Pers. ex Fr.), dieback, twig canker. N. Dak. to Tex. and Oreg.
Didymosphaeria sp., on twigs. Tex.
Eutypella scoparia (Schw.) Ell. & Ev. and *E. stellulata* (Fr.) Sacc., on branches. Ala., Ga., La.
Gloeosporium ulmicola Miles, leaf spot. Conn., Ga., Kans., Tenn., Tex.
Gnomonia ulmea (Schw. ex Fr.) Thuem., black spot. Widespread.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Libertella sp., canker. Colo.
Meloidogyne spp., root knot nematodes. Calif., Okla.
Myxosporium hymenuloides (Sacc.) Hoehn., on twigs. Okla.
Nectria cinnabarina Tode ex Fr., on twigs, coral spot. Widespread.
Phomopsis sp., on twigs ?canker. Wis.
Phyllosticta sp., leaf spot. N.J.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Okla., Tex.
Polyporus gilvus (Schw.) Fr., heart rot. Okla.
Pratylenchus pratensis (De Man) Filip., in roots. Okla.
Pythium spp., damping-off. Great Plains States.
Rhizoctonia solani Kuehn, damping-off. Great Plains States.
Sacidium ulmi-gallae Kell. & Swingle, on leaf galls. Tex.
Schizophyllum commune Fr., wound rot. Calif.
Sphaeropsis ulmicola Ell. & Ev., twig canker. Conn.
Thyrostroma compactum (Sacc.) Hoehn., trunk canker. Ill.
Tuberculariа nigricans (Bull.) Lk. ex Fr., on dead twigs. Md., N. Dak.
T. ulmea Carter, canker, dieback. Ill.

Ulmus rubra Muhl. (*U. fulva* Michx.), slippery elm.

Tall tree of range 15 to 30 inclusive, excepting 17,27, and 28; wood used commercially.

Ceratophorum ulmicola Ell. & Kell., leaf spot. Kans., Nebr.
Ceratostomella ulmi Buis., Ceratostomella wilt, [Dutch elm disease]. Ind., N.Y., Ohio.
Dothiorella ulmi Verrall & May, dieback, wilt. Conn. to Va. and Okla.
Eutypella spp., *E. fraxinicola* (Cke. & Pk.) Sacc., and *E. scoparia* (Schw.) Ell. & Ev., on dead branches. Ga., Ind.
Fomes connatus (Weinm. ex Fr.) Gill., white spongy rot. Conn., Mass.
F. everhartii (Ell. & Gall.) Schrenk—W.Va.
Gloeodes pomigena (Schw.) Colby, on twigs. Ind.
Gloeosporium ulmicola Miles, leaf spot. N.Y.
Gnomonia ulmea (Schw. ex Fr.) Thuem., black spot. Widespread.
Mycosphaerella ulmi Kleb., leaf spot. N.Y. to N.C., Kans., and Wis.
Nectria cinnabarina Tode ex Fr., on twigs, coral spot. Mo.
Nummularia repanda (Fr.) Nits., on branches. Del.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Ind.
Phyllosticta confertissima Ell. & Ev., leaf spot. Kans.
P. erratica Ell. & Ev.—Ala.
P. melaleuca Ell. & Ev.—Ind., Mich., W.Va.
Physalospora obtusa (Schw.) Cke., on branches. Ga.
Phytophthora inflata Caroselli & Tucker, pit canker on trunks. Conn., Mass., N.Y., Pa.
Prosthecium (Pseudovalsa) ulmi Wehm., on twigs. Iowa.
Sacidium ulmi-gallae Kell. & Swingle, on leaf galls. Wis.
Taphrina ulmi (Fckl.) Johans., leaf blister. Kans., Va.
Uncinula macrospora Pk., powdery mildew. Va. to Ind. and Mo.
Verticillium albo-atrum Reinke & Berth., wilt. Pa., Wis.

Ulmus serotina Sarg., red elm.

Large tree with short spreading branches. Range 25,27,29; cultivated for shade, zone 5.

Gnomonia ulmea (Schw. ex Fr.) Thuem., black spot. Miss.
Mycosphaerella sp. (*?M. ulmi* Kleb.), leaf spot. Ga.

Ulmus thomasii Sarg. (*U. racemosa* Thomas non Borkh.), rock or cork elm.

Large tree of range 18,19,21,22,23,24,25,26, 27; wood used commercially. Included here also are records for *U. alata* Michx., wahoo elm or winged elm, similar to the preceding but of southern range; a handsome, round-headed tree sometimes planted as a street tree in the South.

Actinopelte dryina (Sacc.) Hoehn., on leaves. Ill.
Cylindrosporium tenuisporum Heald & Wolf, leaf spot. Tex.
C. ulmicola Ell. & Ev.: See *Mycosphaerella ulmi.*
Daedalea confragosa Bolt. ex Fr., white sapwood rot. Tenn.
Fomes igniarius (L. ex Fr.) Kickx, white spongy heart rot. Tenn.
Gnomonia ulmea (Schw. ex Fr.) Thuem., black spot. Ill., Okla., Tex., Va.
Monochaetia desmazierii Sacc., leaf spot. Ga.
Mycosphaerella ulmi Kleb., leaf spot. Ill., Miss., N.C., Tex.

Nummularia clypeus (Schw.) Cke., on branches. Ill.
Phyllactinia guttata (Fr.) Lév. *(P. corylea* Pers. ex Karst.), powdery mildew. N.C. to Tex. and Ill. (on *U. alata*); Iowa (on *U. racemosa*).
Phyllosticta melaleuca Ell. & Ev., leaf spot. Miss., Wis.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Physalospora obtusa (Schw.) Cke., on branches. Ala.
Septobasidium pseudopedicellatum Burt, brown felt. N.C.
Septogloeum profusum (Ell. & Ev.) Sacc. *(?Mycosphaerella ulmi)*, leaf spot. Ala.
Taphrina ulmi (Fckl.) Johans., leaf blister. Ala., Ark. (on *U. alata).*
Uncinula macrospora Pk., powdery mildew. Widespread.
PHLOEM NECROSIS—elm phloem-necrosis virus *(Morsus ulmi* Holmes). Ala., Ga., Tenn.; Miss. (on *U. alata).*

UMBELLIFERAE

Anethum

A. graveolens L., dill.

European annual or biennial herb, grown for its savory fruit (usually called "seed") used in seasoning; locally naturalized in the Northeast.

Cercospora anethi Sacc., leaf and stem spot. N. Dak., Oreg., Tex.
Cuscuta sp., dodder. Ga.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla.
Phoma anethi (Pers. ex. Fr.) Sacc., leaf and stem spot. Conn., Ind., Iowa.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Rhizoctonia solani Kuehn, damping-off. Ga.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Tex.
YELLOWS—aster, yellows virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). N.Y., Tex.

Angelica

(1) *A. atropurpurea* L., purple-stemmed angelica, alexanders.
(2) *A. lyallii* S. Wats.
(3) *A. triquinata* Michx. (*A. curtisii* Buckl.), filmy angelica.
(4) Other species.

Perennial herbs of woodlands and meadows: (1) in the Northeastern and North Central States, (2) and (4) in the West and Northwest, (3) in the Middle Atlantic area. Several species are of minor forage value or furnish food for wildlife, some are grown in wild gardens, and the roots and fruit (called "seed") of (1) and *A. archangelica* L. of Europe are used in pharmacy.

Cercospora apii Fres. var. *angelicae* Sacc. & Scalia, leaf spot. Alaska (4).
C. thaspii Ell. & Ev., leaf spot. Ala., Tex. (4).
Colletotrichum dematium (Fr.) Grove, on stems. N.Y. (1)
Fusicladium angelicae (Fr.) Lind *(F. depressum* (Berk. & Br.) Sacc.), leaf spot. General (1,2,3, 4). This combination is antedated by *F. angelicae* Ell. & Ev. and should perhaps be written *F. angelicae* (Fr.) Ell. & Ev.; associated with and reputed to be the conidial stage of *Phyllachora angelicae* (Fr.) Fckl., to which *Didymella angelicae* (Ell. & Ev.) Sacc. and *Mycosphaerella angelicae* (Fckl.) Petr. have also been applied.
Gloeosporium angelicae Cke., leaf spot. S.C. (4).
Heterosporium sp., on stems. Wyo. (4).
Leptostromella angelicae Dearn. & House, on stems. N.Y. (1).
Phoma complanata (Tode ex Fr.) Desm., on stems. Wyo. (4).
Phyllosticta angelicae Sacc., leaf spot. Calif., Wyo. (4). Associated with *Fusicladium angelicae*, q.v., and *Phyllachora angelicae.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (4).
Piggotia depressa Dearn., leaf spot. Mont. (2). Associated with *Fusicladium.*
Puccinia angelicae (Schum.) Fckl. (O,I,II,III), rust. N.Y. (1); Oreg., Pa., Wash. (2,4); Tex. (4).
P. bistortae (Strauss) DC. (O,I), rust. Alaska (4).
P. coelopleuri Arth. (O,I,II,III), rust. Alaska (4).
P. ellisii De T. (O,I,II,III), rust. Calif. (2,4); Idaho, Nev., Oreg., Wash. (4).
P. ligustici Ell. & Ev. (III), rust. Colo., Alaska (4).
P. poromera Holw. (III), rust. Utah (4).
Ramularia angelicae Hoehn., leaf spot. Colo., Alaska (4).
R. grantii Dearn.—Wash. (4).
Septoria dearnessii Ell. & Ev., leaf spot. Wis. (1), N.C. (3), Tex. (4).

Apium

(1) *A. graveolens* L. var. *dulce* DC., celery.
(2) *A. graveolens* var. *rapaceum* DC., celeriac.

Biennial or perennial herb of Europe, grown widely in gardens for its edible leafstalks (1) or root crown (2); commercial cultivation chiefly in California, Florida, Michigan, New York, Ohio, Pennsylvania, New Jersey, and Colorado.

Alternaria sp., leaf spot (?secondary). Fla. (1). *A. tenuis* Auct. is reported on seed from U. S. sources.
Ansatospora macrospora (Osterwalder) Newhall: SEE *Centrospora acerina.*
Aphanomyces euteiches Drechs., damping-off. Mass. (1).
Botrytis cinerea Pers. ex Fr., gray-mold rot. Cosmopolitan in transit and markets; sometimes stem rot in fields—Calif., Mass., Wash., Alaska (1).
Centrospora acerina (Hartig) Newhall, storage rot. N.Y. (1).
Cercospora apii Fres., early blight. General (1); Conn., Ill., N.Y. (2).
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. Calif. (1).
Dolichodorus ?heterocephalus Cobb, nematode associated with red root, q.v. Fla. (1).
Erwinia carotovora (L. R. Jones) Holland, bacterial soft rot. Cosmopolitan in transit and markets. Crater rot of older petioles. Calif.
Fusarium oxysporum Schlecht. f. *apii* (R. Nelson & Sherb.) Snyd. & Hans. (*F. orthoceras* Appel & Wr. var. *apii* (R. Nelson & Cochran) Wr. & Reinking), Fusarium yellows, wilt. General in the northern celery districts from Conn. and N.J. to Ind. and Minn., also Calif., Colo., Mo., Mont. (1). *Fusarium* spp., associated with root rot, are reported from Calif., Colo., Fla., Mich., N.J., Ohio (1).

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.

Meloidogyne spp., root knot nematodes. Southern States from Va. to Fla. and Calif.; occasional in N.J. to Ind., Kans., and Mich.; Oreg.

Phoma apiicola Kleb., Phoma root rot. Calif., Mich., N.Y., Ohio, ?Wis. (1); N.Y. (2).

Phyllosticta apii Halst., leaf spot. Del., N.J., P.R. (1).

Physarum spp., in part *P. cinereum* (Batsch) Pers., slime mold. Calif., Fla., N.Y., Ohio (1).

Pseudomonas apii Jagger (*P. jaggeri* Stapp), bacterial leaf spot. Conn., Del., Fla., Ind., Mich., Minn., N. Dak., N.Y., Ohio (1).

Pythium spp., damping-off, root rot. *P. deBaryanum* Hesse reported in Colo., Conn., Fla., N.H.; *P. ultimum* Trow in Ohio on (1).

Rhizoctonia solani Kuehn, damping-off, root rot, sometimes pitting of stalks. Cosmopolitan (1).

Sclerotinia spp., damping-off and stem rot in fields; pink rot and watery rot in transit and storage. General (1), Calif. (2). *S. sclerotiorum* (Lib.) d By. commonly reported; *S. intermedia* Ramsey and *S. minor* Jagger also identified.

Septoria apii (Briosi & Cav.) Chester, large leaf spot, late blight. General (1,2). The name *S. apiicola* Speg. has priority, but its identity with the large leaf spot pathogen is not confirmed.

S. apii-graveolentis Dorogin, small leaf spot, late blight. Probably general, identified in Calif., Fla., Ind., Mass., Mich., Ohio, Oreg., Wash. (1); Calif., Mich. (2). More destructive than the preceding but often occurring together, not discriminated in early reports.

Stemphylium ramulosum Sacc., on leaves, ?secondary leaf spot. Fla. (1). *S. botryosum* Wallr. is reported on seed.

Trichothecium roseum Lk. ex Fr., pink mold in storage. N.Y. (1).

Typhula variabilis Riess, storage rot. N.Y.

Verticillium albo-atrum Reinke & Berth., wilt. Calif. (1).

Calico—celery calico virus (*Marmor aevi* Holmes, Apium virus 2 Severin & Freitag ex K.M.Sm.). Calif. (1).

Crinkle leaf—unidentified virus. Calif. (1); a disease designated by this name also reported from Idaho. (1).

Curly top—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Oreg. (1); also experimental in Calif. (1).

Mosaic—viruses. Generally reported, causal virus mostly unspecified or unidentified. "Celery virus 1," the southern celery mosaic strain of the cucumber mosaic virus (*Marmor cucumeris* var. *commelinae* Holmes) most often either assumed to be present or actually determined, as far west as Colorado. Cucumber mosaic virus (*M. cucumeris* Holmes, Cucumis virus 1 K.M.Sm.), reported in Iowa, Minn., N.J., N.Y., probably elsewhere (1). Western celery mosaic virus (*M. umbelliferarum* Holmes, Apium virus 1 Severin & Freitag ex K.M.Sm.)—Calif. (1,2), Wash. (1).

Pseudocalico—unidentified virus. Calif. (1).

Ring spot—unidentified virus. Calif. (1).

Spotted wilt—virus (*Lethum australiense* Holmes, Lycopersicon virus 3 K.M.Sm.). Calif. (1,2), T.H. (1).

Yellow spot—unidentified virus (not spotted wilt). Calif. (1).

Yellows—western aster yellows or celery yellows virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif. (1,2); Idaho, ?Utah, Wash. (1). The western strain of the virus is supposed not to occur in the East, and celery is reported to be immune from infection by the type or eastern strain; nevertheless, aster yellows is reported sporadically or occasionally on celery in Maine, N.Y., Pa., and Wis., usually in very scanty amounts or in experimental plantings.

Blackheart (heart rot)—physiological, attributed to wide fluctuations in soil moisture. General, especially in Calif. and Fla.; also in markets (1).

Brown stem (discoloration and pitting of stalks)—probably physiological, usually in overage plants; often associated with blackheart. Calif., Fla.

Cracked stem, stem canker—boron deficiency. Occasionally reported in all celery districts, especially Calif., Fla., Mass., Mich., N.Y. (1).

Growth crack—physiological, in part due to irregularities in nutrition and moisture, sometimes to boron deficiency. Calif., Fla. (1).

Hollow stem, pithiness—physiological, sometimes caused by chilling or drought; perhaps sometimes genetic. Calif., Fla., Md., Pa. (1).

Red root—physiological (with secondary fungi), associated with acid soils and phosphorus deficiency: nematodes also reported associated. Fla. (1).

Arracacia

A. xanthorrhiza Bancr., apio.

Perennial herb of northern South America, grown for its edible roots.

Erysiphe polygoni DC., powdery mildew. P.R.

Bupleurum

B. fruticosum L., thoroughwax.

Evergreen shrub of southern Europe, grown for ornament.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. Calif.

Carum

C. carvi L., caraway.

Perennial herb of Europe, grown for its savory fruit (called "seed"); locally naturalized in the Eastern and Central States; a wildlife-food plant.

Cuscuta sp., dodder. Wash.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. ?Fla.

Sclerotinia sclerotiorum (Lib.) d By., stem rot. Wash.

Yellows—?western aster yellows virus (*Chlorogenus callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Wash.

Centella

C. erecta (L. f.) Fern. (*C. asiatica* of authors).

Perennial herb of wet meadows in the Southeastern and Gulf States and tropical America; of food value for wildlife.

Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.

Meloidogyne sp., root knot nematodes. T.H.

Septoria asiaticae Speg., leaf spot. P.R.

S. hydrocotyles Desm.—Fla.

Cicuta, waterhemlock

(1) *C. bulbifera* L.

(2) *C. maculata* L., spotted cowbane, musquashroot.

(3) *C. occidentalis* Greene.
(4) Other species.

Coarse perennial herbs of bogs and meadows; wildlife-food plants; sometimes grown in wild gardens but noted as poisonous plants, especially (2), their toxic properties affecting human beings and livestock.

Ascochyta thaspii Ell. & Ev., leaf spot. Wis. (2).
Cylindrosporium cicutae Ell. & Ev., leaf spot. Tex., Wis., ?W.Va. (2).
Helminthosporium interseminatum Berk. & Rav., on stems, ?leaf spot. Pa., Tex. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Plasmopara nivea (Unger) Schroet., downy mildew. Wis. (2).
Protomyces macrosporus Unger, leaf gall. Wis. (2).
Puccinia cicutae Lasch. (O,I,II,III), rust. Maine, ?Mont., Nebr., N.Y., Wis. (2); Idaho to Colo., Calif., and Oreg. (3); Calif., Fla., Nev., Alaska (4).
Septoria sii Rob. & Desm., leaf spot. Wis. (1,2), Kans. (2). Wyo. (3).
Uromyces scirpi (Cast.) Burr. (O,I), rust. Nebr., Wis. (1); Pa. to Fla., Colo., and Wis. (2). II and III on *Scirpus* spp.
YELLOWS—western aster yellows virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif.

Coriandrum

C. sativum L., coriander.

European annual grown for its savory fruit (called "seeds"); locally escaped in various parts of the United States.

Glocosporium sp., anthracnose. Md.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla.

Daucus

D. carota L. var. *sativa* DC., carrot.

European annual or biennial herb, cultivated throughout the United States for its fleshy edible roots; commercial production chiefly in California, Texas, Louisiana, New York, New Jersey, Illinois, Pennsylvania, and Ohio. The prototype, *D. carota* L., wild carrot, or Queen-Annes-lace, is widely naturalized and is a troublesome weed, especially in the Northeast.

Actinomyces scabies (Thaxt.) Güssow: SEE *Streptomyces scabies*.
Alternaria dauci (Kuehn) Groves & Skolko (*Macrosporium carotae* Ell. & Langl.), leaf blight. General; late blight—N. Mex.
A. radicina Meier. Drechs., & Eddy, black rot. Mass., N.Y., Pa.; Idaho, Wash., ?Calif. Also placed in *Stemphylium* as *S. radicinum* (Meier, Drechs., & Eddy) Neerg.
A. tenuis Auct., secondary leaf spot and seed mold. Cosmopolitan.
Botryotinia fuckeliana (d By.) Whet.: perfect stage of *Botrytis cinerea*, q.v.
Botrytis cinerea Pers. ex Fr., gray-mold rot. Cosmopolitan in storage and markets, sometimes in fields
Centrospora acerina (Hartig) Newhall, storage rot, black crown or side rot. N.Y.
Cercospora carotae (Pass.) Solh., leaf spot, blight. General, especially in the Northeastern and Central States; also T.H., P.R., V.I.
Cuscuta sp., commonly *C. arvensis* Beyr., dodder. Idaho, Miss., N.Mex., N.Y., Tex., W.Va.
Diaporthe arctii (Lasch) Nits., on stems. Ga.
Erwinia carotovora (L. R. Jones) Holland, bacterial soft rot. General.
Fusarium spp., dry rot. Idaho, N.H.; occasional in markets. Associated with scab in Ariz. and Calif.; with wilt in N. Mex. Specific identity not determined but *F. avenaceum* (Fr.) Sacc. has been shown pathogenic to roots; *F. moniliforme* Sheldon has been isolated from seed. *F. avenaceum* present with Gliocladium rot in stored carrots in N.Y.
Gliocladium aureum Rader, in stored carrot roots. N.Y.
Helicobasidium purpureum Pat.: perfect stage of *Rhizoctonia crocorum*, q.v.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. General in the South, occasionally in the Northeastern, North Central, and Pacific Coast States; Idaho.
Pellicularia filamentosa (Pat.) Rogers, storage rot. N.Y.
Penicillium spp., in part *P. expansum* Lk. ex Thom, blue-mold rot. Occasional in transit and storage.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., La., Tex.
Phytophthora megasperma Drechs., root rot. Calif.
Pythium sp. (*?P. ultimum* Trow), damping-off, wound rot. Idaho.
Ramularia sp., leaf spot. Kans.
Rhizoctonia spp., probably mostly *R. solani*, q.v., root canker, hairy root, scurf. Mich., N.Y., Oreg., Wash.
R. carotae Rader, crater rot. Ill., N.Y.
R. crocorum (Pers.) DC. ex Fr., violet root rot, violet Rhizoctonia. Oreg., Tex., Wash.
R. microsclerotia Matz, foliage blight. P.R.
R. solani Kuehn, damping-off of seedlings, crown rot of roots. General, especially in the Northeastern and Central States; also Tex. and the Pacific Northwest. Sterile stage of *Pellicularia filamentosa* (Pat.) Rogers, q.v.
Rhizopus spp., especially *R. tritici* K. Saito and *R. stolonifer* (Ehr. ex Fr.) Lind, black-mold rot. Cosmopolitan in transit and storage.
Sclerotinia sclerotiorum (Lib.) d By., watery soft rot, cottony rot. General. *S. intermedia* Ramsey and *S. minor* Jagger have also been identified in this connection.
Sclerotium rolfsii Sacc., southern blight. Ga. to Fla. and Tex.: Calif., Oreg., P.R. Also reported in N.Y. but probably the form known as *S. delphinii* Welch.
Septoria sp., on leaves. N.Y.
Stemphylium botryosum Wallr. and *S. consortiale* (Thuem.) Groves & Skolko are reported on seed. For *S. radicinum* (Meier, Drechs. & Eddy) Neerg., see *Alternaria radicina*.
Streptomyces scabies (Thaxt.) Bergey (*Actinomyces scabies* (Thaxt.) Güssow), scab. Calif., Mich., Pa., Wash.
Trichothecium roseum Lk. ex Fr., pink-mold rot. Ind
Typhula sp., storage rot (?secondary). Ill., N.Y.
T. variabilis Riess leaf rot. Idaho.
Uromyces scirpi (Cast.) Burr. (O,I), rust. Oreg. II and III on *Scirpus*
Xanthomonas carotae (Kendr.) Dows., bacterial blight. bacterial scab. Calif., Idaho, Iowa, Oreg.
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Oreg., Utah.
MOSAIC—western celery mosaic virus (*Marmor umbelliferarum* Holmes, Apium virus 1 Severin & Freitag ex K.M.Sm.). Calif.
YELLOWS—aster yellows virus (*Chlorogenus callisteph* Holmes, Callistephus virus 1 K.M.Sm.). Widespread, reported from Maine to Pa. west to Kans.

Colo., and Wyo.; La., Tex. Western aster yellows or celery yellows virus *(C. callistephi californicus* Holmes, Callistephus virus 1A K.M.Sm.)—Calif., Idaho, Oreg., Wash. Diseases with somewhat different symptoms, probably virus-induced, are reported as chlorosis in Wash., green dwarf in Idaho and a similar disease in Tex., and bunchy top in La.

BLACKHEART—cause unknown, ?physiological. Wis.

CHLOROSIS—magnesium deficiency associated with acid soil. Mass.

ROOT GIRDLE—cause unknown. Wash.

Erigenia

E. bulbosa (Michx.) Nutt., harbinger-of-spring.

Perennial herb of Eastern and Central States, grown in wild gardens.

Puccinia erigeniae (Orton) Arth. (O,I,III), rust. Ohio.

Eryngium

(1) *E. aquaticum* L. (*E. virginianum* Lam.), button-snakeroot, eryngo.
(2) Species not determined or not designated.

E. aquaticum, a perennial herb of wet ground in the Eastern and Central States and southward, a wildlife-food plant. Other species are grown in wild gardens.

Cylindrosporium eryngii Ell. & Kell., leaf spot. Iowa, Kans., Wis. (1); Tex. (2).
Entyloma eryngii (Cda.) d By., white smut. Iowa. (1).
Macrophomina phaseoli (Maubl.) Ashby, stem rot. Okla. (2).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2).
Septoria eryngicola Oud. & Sacc., leaf spot. Wis. (1).

Foeniculum

(1) *F. vulgare* Mill., fennel.
(2) *F. vulgare* var. *dulce* (Mill.) Fiori, Florence fennel, finocchio.

Perennial herbs of Europe: (1) grown for its savory and aromatic foliage and fruit (called "seed"), (2) for its edible leaf bases.

Botrytis cinerea Pers. ex Fr., gray-mold rot. N.Y. (1).
Erwinia carotovora (L. R. Jones) Holland, bacterial soft rot. Ill. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. ?Fla. (1).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1).
Rhizoctonia solani Kuehn, damping-off, stem pitting. Ga., N.J. (1).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Ill., N.J., Tex. (2).

Heracleum

H. maximum Bartr. (*H. lanatum* Michx.), cowparsnip.

Coarse perennial herb of moist meadows in the Eastern, Central, and Pacific Coast States; a wildlife-food plant, sometimes grown in wild gardens.

Cylindrosporium heraclei (Fr.) Ell. & Ev., leaf spot. Calif., Colo., Idaho, Mont., N.Dak., Tex., Utah, Wash., Wyo. Variously placed in *Phleospora, Septoria,* and other genera; sometimes associated with *Phyllachora heraclei* (Fr.) Fckl. *(?Mycosphaerella heraclei* (Fr.) Petr.) but connection not confirmed.
Diaporthe arctii (Lasch) Nits., on stems. Calif.
Didymella exigua (Niessl) Sacc., on stems. Mont.
Fusicladium angelicae (Fr.) Ell. & Ev., leaf spot. Wis.
Naevia stenospora Sacc., on dead stems. Wash.
Phoma spp., on stems. Species reported include: *P. asteriscus* Berk.—Maine; *P. complanata* (Tode ex Fr.) Desm.—Calif., Colo., N. Mex., Utah, Alaska; *P. heraclei* Earle—Colo., Tex.
Phyllosticta heraclei Ell. & Dearn., leaf spot. Oreg., Tex., Alaska.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Ramularia heraclei (Oud.) Sacc., leaf spot. General.
Rhabdospora heraclei Earle, on stems. Nev.
R. pastinacina (Sacc.) Allesch., on stems and seeds. Alaska.
Septoria heraclei (Lib.) Desm.: SEE *Cylindrosporium.*

Hydrocotyle, pennywort

(1) *H. americana* L.
(2) *H. ranunculoides* L. f.
(3) *H. sibthorpioides* Lam. (*H. rotundifolia* Roxb.)
(4) *H. umbellata* L.
(5) Species not determined or not designated.

Creeping perennial herbs of moist to aquatic habitats in the Eastern and Central States and southward; some species in the West; several species are wildlife-food plants; (1,2,4) are native; (3), adventive from tropical Asia, has become a troublesome lawn weed in certain eastern areas.

Cercospora hydrocotyles Ell. & Ev., leaf spot. Md. to Fla. and Tex. (1,2,4).
Entyloma hydrocotyles Speg., white smut. Calif. (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. ?Fla. (1,4), Md. (3).
Puccinia hydrocotyles (Lk.) Cke. (II), rust. Del. to Fla. and Tex., also Ariz., Calif., Nev., Utah (2,4); T.H.
Septoria hydrocotyles Desm., leaf spot. N.Y., Wis. (1); Miss. (5).
S. pallidula Dearn. & House—N.Y. (1).
Synchytrium aureum Schroet., leaf gall. Wis. (1).
S. hydrocotyles M. T. Cook, leaf gall. La. (5).
Uromyces scirpi (Cast.) Burr. (O,I), rust. Del., Fla., Mass. (4).

Ligusticum, lovage

(1) *L. canadense* (L.) Britton
(2) *L. scothicum* L., sea-lovage.
(3) Other species.

Native, smooth perennial herbs, some of food value for wildlife.

Aecidium ligustici Ell. & Ev. (O,I), rust. Maine (2).
Cylindrosporium heraclei (Fr.) Ell. & Ev., leaf spot. Calif., Wyo. (3).
Diaporthe arctii (Lasch) Nits., on stems. Ga. (1).
Heteropatella alpina (Ell. & Ev.) W. B. Cke., on stems. Calif. (3).
Mycosphaerella sp., on stems. Ga. (1).
Nyssopsora echinata (Lév.) Arth. (III), rust. Calif., Idaho, N. Mex., Oreg., Utah, Wash. (3).
Plasmopara nivea (Unger) Schroet., downy mildew. Alaska (2).

Puccinia ligustici Ell. & Ev. (III), rust. Calif., Colo., Idaho, Nev., Oreg., Utah, Wash., Wyo. (3).
Septoria sp. (=*S. aromatica* Kab. & Bub.), leaf spot. Calif. (3).
S. ligustici Guba—Mass. (2).
Urophlyctis pluriannulata (Berk. & Curt.) Farl., leaf gall. Oreg., Wash., Wyo. (3).

Lomatium, biscuitroot, lomatium

(1) *L. angustatum* (Coult. & Rose) St. John
(2) *L. foeniculaceum* (Nutt.) Coult. & Rose
(3) *L. grayi* Coult. & Rose
(4) *L. orientale* Coult. & Rose
(5) *L. triternatum* (Pursh) Coult. & Rose
(6) Other species.

Perennial, tuberous-rooted herbs of prairies, plains, and foothills, ranging nearly throughout the Western States; of significant forage value; also furnish food for wildlife; some species grown for ornament in wild gardens.

Cercosporella herpotrichoides Fron, on stems. Idaho, Oreg., Wash. (5).
Phoma lomatiae Speg., on leaves. Oreg. (5).
?Phyllachora sp., leaf spot. Wash. (3, 6).
Plasmopara nivea (Unger) Schroet., downy mildew. Mont.
Puccinia asperior Ell. & Ev. (O,I,III), rust. On *L. dissectum* (Nutt.) Math. & Const. in Calif., Oreg., Wash.
P. jonessi Pk. var. *typica* Arth. (O,I,III), rust. Oreg. (1); Kans., Nebr. (2); Utah, Wash. (3); Ariz., Colo., Nebr., Okla., Wyo. (4); Oreg., Wash. (5); Mont. to Okla., Calif., and Wash. (6).
P. ligustici Ell. & Ev. (III), rust. Idaho, Wash. (6).

Osmorhiza, sweet-cicely, sweetroot

(1) *O. claytoni* (Michx.) Clarke, sweet-jarvil.
(2) *O. longistylis* (Torr.) DC., anise-root.
(3) *O. occidentalis* (Nutt.) Coult. & Rose
(4) Other species.

Perennial herbs of woodlands and meadows in the Eastern (1,2) or Central and Western States (3,4); of minor forage value, especially (3); also wildlife-food plants; (1,2) are grown in wild gardens for ornament and for the aromatic fruit (called "seeds").

Cercospora osmorhizae Ell. & Ev., leaf spot. Ill., Ohio, Wis. (1); Md., Ohio, Wis. (2).
Centrospora acerina (Hartig) Newhall (*C. praegrandis* Sprague)—Oreg. (4).
Colletotrichum dematium (Fr.) Grove, on stems. Pa. (1); Nebr., Va. (2).
Fusicladium angelicae (Fr.) Ell. & Ev., leaf spot. Wash. (4).
Mycosphaerella sp., on stems. Nev. (3).
M. glycosmae Tracy & Earle—Colo. (3).
Phleospora osmorrhizae (Pk.) House, leaf spot. N.Y. (1,2); Iowa, Wis. (2); Mont., Wyo. (3); Calif., Colo., Idaho, Wash., Wyo. (4).
Puccinia pimpinellae (Strauss) H. Mart. (O,I,II,III), rust. General (1,2,3).
Ramularia reticulata Ell. & Ev., leaf spot. Wis. (1); Va., Wis. (2); Wyo. (4).
Septoria aegopodii Desm., leaf spot. Ohio (1); N.Dak., N.Y., Wis. (2).
S. micropuncta Ell. & Ev. Va. (1).
S. occidentalis Ell. & Ev. (nomen nudum). Wash. (3,4).
Urophlyctis pluriannulata (Berk. & Curt.) Farl., leaf gall. Mont. (2).

Pastinaca

P. sativa L., parsnip.

European biennial herb, cultivated as a garden vegetable for its edible root or as a field crop mainly in the Northeastern and North Central States; also escaped and locally established as a weed.

Actinomyces scabies (Thaxt.) Güssow: See *Streptomyces scabies.*
Agrobacterium tumefaciens (E.F.Sm. & Towns.) Conn, crown gall. Va.
Alternaria sp., leaf spot. N.J. *A. tenuis* Auct. occurs on seed.
Botrytis cinerea Pers. ex Fr., gray-mold rot. Occasional in transit and storage.
Cercospora pastinacae (Sacc.) Pk., leaf spot. Md., N.Y., Nebr., Tex., W.Va.
C. pastinacina Solheim, leaf spot. Calif., Ind., Mich., N.Y.
Cylindrosporium crescentum Barth.—Tex.
C. pastinacae (West.) Lind, leaf spot. Utah, Wis. Reputed to be the conidial stage of *Phyllachora pastinacae* (West.) Rostr. but asci not found in the U.S.
Cyphellopycnis pastinacae Tehon & Stout, on stems. Ill.
Diaporthe arctii (Lasch) Nits., on stems. N.Y.
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. Occasional in storage and markets.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. N.J. to Kans., and southward; Colo., Conn., Oreg.
Phoma nebulosa (Pers. ex Fr.) Berk., ?root rot. Pa., Tex.
Phomopsis diachenii Sacc., on seeds (achenes). N.Y., Wis.
Phyllachora pastinacae (West.) Rostr.: See *Cylindrosporium.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Phytophthora parasitica Dast., dry rot. Pa.
Pleospora diaporthoides Ell. & Ev.—N.J.
Ramularia pastinacae (Karst.) Lindr. & West., leaf spot. Ind., Mass., N.Dak., N.Y., Ohio, Oreg., Tex., Wash., Wis.; probably Calif.
Rhabdospora pastinacina (Sacc.) Allesch., on stems. N.Y., Utah.
Rhizoctonia solani Kuehn, black scurf., ?root rot. N.C., Tex., Wash.
Rhizopus spp., black mold rot. Occasional in storage and markets.
Sclerotinia sclerotiorum (Lib.) d By., watery soft rot. Calif., Idaho, Ind., La., Mass., N.Y., Oreg., Tex.
Septoria pastinaceae West., leaf spot. Tex.
Streptomyces scabies (Thaxt.) Bergey (*Actinomyces scabies* (Thaxt.) Güssow), scab. Wash.
MOSAIC—unidentified virus. Oreg., Utah.
YELLOWS—aster yellows virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Ill., Maine, N.Y., Pa., S.Dak., Tex., Wis. Western aster yellows virus (*C. callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.)—Calif., Wash.
HEART ROT—boron deficiency. N.Y.

Petroselinum

P. crispum (Mill.) Nym., parsley.

Biennial herb of Europe, grown widely in gardens for garnish purposes; commercial production chiefly in Texas, New Jersey, Virginia, and California.

Alternaria dauci (Kuehn) Groves & Skolko, leaf blight. Conn. *Alternaria* sp., reported as associated with

leaf spot in N.J. and Tex., may be this. *A. radicina* Meier, Drechs. & Eddy and *A. tenuis* Auct. are also reported on seed.
Botrytis cinerea Pers. ex Fr., gray-mold rot. Alaska.
Cercospora petroselini Sacc., leaf spot. N.J.
Cuscuta sp., dodder. Tex.
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. Calif.
Erwinia aroideae (Town.) Holland, bacterial soft rot. Calif.
E. carotovora (L.R.Jones) Holland—Fla.
Fusarium sp. (*?F. oxysporum* Schlecht.), wilt. N.J., Va.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. Fla., Ga., Kans., Tex., Va.
Phyllosticta petroselini Rothers, ?on leaves. N.Y.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pythium sp., damping-off. N.J.
Rhizoctonia solani Kuehn, damping-off, root rot. N.J., N.Y., Tex.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Conn., Ga., La., N.Y., Pa., Tex., Va.
Septoria petroselini Desm., leaf blight. Calif., Conn., N.J., N.Y., Tex.
Stemphylium botryosum Wallr., on seed.
CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif.
YELLOWS—aster yellows virus (*Chlorogenus callistephi* Holmes, Callistephus virus 1 K.M.Sm.). Colo., N.Y., Tex. Western aster yellows virus (*C. callistephi* var. *californicus* Holmes, Callistephus virus 1A K.M. Sm.), in Calif.
YELLOWS—a disease of nonparasitic origin. N.Y.

Pimpinella

P. anisum L., anise.

European annual herb grown in herb and medicinal plant gardens for flavoring.

Cercospora malkoffii Bub., leaf spot. Va.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Puccinia pimpinellae (Strauss) H.Mart. (O,I,II,III), rust. Calif.
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Calif., Tex.

Pseudocymopterus

(1) *P. anisatus* (A. Gray) Coult. & Rose
(2) *P. montanus* (A. Gray) Coult. & Rose

Perennial alpine herbs of the Rocky Mountain States; wildlife-food plants.

Mycosphaerella sp., on stems. Colo.
Puccinia musenii Ell. & Ev. (III), rust. Colo., Mont., Wyo. (1).
P. pseudocymopteri Holw. (O,I,II,III), rust. Utah (1); Colo., N.Mex., Utah, Wyo. (2).

Sanicula, black snakeroot, sanicle

(1) *S. canadensis* L.
(2) *S. marilandica* L.
(3) Other species.

Perennial herbs of woodlands in the Eastern and Central States and southward (1,2) or in the Western States (3); wildlife-food plants.

Ascochyta thaspii Ell. & Ev., leaf spot. Wis. (2,3).
Cercospora saniculae J.J.Davis, leaf spot. Wis.
Entyloma saniculae Pk., white smut. Ill., Ind., Iowa, Md., N.Y., Va., Wis. (2); Ala., Calif., Oreg., Wis. (3).
Puccinia marylandica Lindr. (O,I,II,III), rust. Mo., Tenn., W.Va. (1); Colo., Ind., Iowa, N.C., Pa., Tenn., Wis. (2); N.Y. to Fla, Mo., and S.Dak. (3).
Septoria saniculae Ell. & Ev., leaf spot. Nebr. (1); Iowa, Wis. (2).
Urophlyctis pluriannulata (Berk. & Curt.) Farl., leaf gall. Miss. (1); Ill., Iowa, Mich., N.Y., Wis. (2); Ala., Calif., Oreg., Wash., Wis. (3).

Sium

S. suave Walt., waterparsnip.

Tall perennial plant of marshes, ranging nearly throughout the United States; a wildlife-food plant.

Cercospora sii Ell & Ev., leaf spot. Iowa, Wis.
Phyllosticta sp., leaf spot. N.Dak.
Physoderma vagans Schroet., leaf spot. Wis.
Septoria sii Rob. & Desm., leaf spot. Maine, N.Dak., N.Y., Wis.
Uromyces scirpi (Cast.) Burr. (O,I), rust. N.Dak., N.Y., Wis.

Taenidia

T. integerrima (L.) Drude

Perennial herb of Eastern and Central States and southward, sometimes grown in wild gardens.

Fusicladium angelicae (Fr.) Ell. & Ev. (*?Cercospora platyspora* Ell. & Holw.), leaf spot. Wis.
Puccinia angelicae (Schum.) Fckl. (O,I,II,III), rust. Ind., Mich., Mo., N.Y., Wis.
Septoria pimpinellae Ell., leaf spot. Minn.

Trachymene

T. caerulea R. Graham, blue laceflower.

Annual herb of Australia, grown for ornament.

Fusarium sp., root rot. Conn., N.J.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Fla.
Rhizoctonia solani Kuehn, stem rot. N.J.
YELLOWS—western aster yellows virus (*Chlorogenus callistephi* Holmes var. *californicus* Holmes, Callistephus virus 1A K.M.Sm.). Calif.

Zizia

(1) *Z. aptera* (A. Gray) Fern. (*Z. cordata* of authors)
(2) *Z. aurea* (L.) Koch, meadowparsnip, golden-alexander.

Perennial herb (1) of meadows and marshes in the Eastern and Central States and southward; sometimes grown in wild gardens; (2) is a woodland plant of similar range and westward.

Ascochyta thaspii Ell. & Ev., leaf spot. Wis. (1,2).
Cercospora ziziae Ell. & Ev., leaf spot. Pa. (1), Wis. (2).
Cylindrosporium ziziae Ell. & Ev., leaf spot. N.Dak., Wash., Wis. (1).
Erysiphe polygoni DC., powdery mildew. Pa., W.Va.
Puccinia ziziae Ell. & Ev. (III), rust. Wash. (1).
Septoria ziziae Ell. & Ev., leaf spot. N.Dak. (1).
Urophlyctis pluriannulata (Berk. & Curt.) Farl., leaf gall. Iowa, Wis. (2).

URTICACEAE

Boehmeria

B. cylindrica (L.) Sw., false-nettle, bog-hemp.
Perennial herb of eastern North America; useful to wildlife.

Aecidium boehmeriae Arth. (O,I), rust. Ind., Md., N.Y.
Cercospora boehmeriae Pk., leaf spot. Ala., N.C., Nebr., N.Y., Pa., Tenn., W.Va., Wis
Phyllosticta boehmeriicola J.J.Davis, leaf spot. Wis.
Septoria tenuissima Wint., leaf spot. Kans., Mo.
Synchytrium cellulare J.J.Davis, leaf gall. Wis.

Castilla (Castilloa)

C. elastica Cerv., Mexican rubber tree.
Rubber-producing plant of tropical America.

Botryodiplodia theobromae Pat. (*Diplodia cacaoicola* P. Henn., *D. rapax* Mass.), dieback. West Indies.
Polyporus lignosus Kl., heart rot. Tropical America.
Rosellinia bunodes (Berk. & Br.) Sacc., root rot. West Indies.
Uredo artocarpi Berk. & Br., rust. West Indies.

Parietaria, pellitory

P. pensylvanica Muhl.
Annual herb of temperate North America; useful to wildlife.

Erysiphe cichoracearum DC., powdery mildew. Ohio to Kans. and Wis.
Plasmopara illinoensis (Farl.) J.J.Davis, downy mildew. Wis.
Ramularia parietariae Pass., leaf spot. Mo.
Septoria parietariae J.J.Davis, leaf spot. Iowa, Wis.

Pilea

(1) *P. microphylla* Liebm., artilleryplant.
(2) *P. pumila* (L.) A. Gray, clearweed.
(3) Other species.

Small biennial (1) or annual (2) herbs: (1) of tropical America, grown as a pot plant under glass or for edging garden borders in warm regions; ornamental in habit; (2) of eastern North America, a minor weed in cultivated ground but useful to wildlife.

Erysiphe cichoracearum DC., powdery mildew. Ill., Ind., Iowa (2).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Irene triloba (Wint.) Th. & Syd., black mildew. P.R. (3).
Meliola earlii F.L.Stevens, black mildew. P.R. (3).
Meloidogyne sp., root knot nematodes. Fla. (1).
Pythium dissotocum Drechs., rootlet rot. Md. (2).
Septoria pileae Thuem., leaf spot. Ill., Ind., Iowa, Mich., Mo., N.Y., Wis.

Pipturus

P. albidus (Hook & Arn.) A. Gray
Shrub of the Hawaiian Islands with alternate, ovate, triplinerved leaves.

Botryosphaeria ribis Gross. & Dug. var. *chromogena* Shear, N.E.Stevens, & M.S.Wilcox, on branches. T.H.
Cercospora pipturi F.L.Stevens & Glick, leaf spot. T.H.
Irenina triloba (Wint.) F.L.Stevens, black mildew. T.H.

Urtica, nettle

(1) *U. dioica* L., stinging-nettle.
(2) *U. gracilis* Ait.
(3) Other species.

Perennial (1,2) or annual herbs, native (2) or introduced (1), and widely dispersed; minor weeds but useful to wildlife; one species grown for ornament.

Aecidium libertum Arth. (O,I), rust. Okla. (3).
Cylindrosporium urticae Dearn., leaf spot. Wash. (3).
Didymosphaeria superflua (Auers.) Niessl (*?Phoma nebulosa* (Pers. ex Fr.) Berk.), on stems. Calif., Mont. (2).
Erysiphe cichoracearum DC., powdery mildew. Ill. (2), Calif. (3).
Helminthosporium urticae Pk., on stems. N.Dak., N.Y., Tex. (2).
Leptosphaeria acuta (Moug.) Karst. (*Phoma acuta* Fckl.), on stems. Calif. (2,3); Wash., Alaska (3).
Peronospora debaryi Salmon & Ware: SEE *Pseudoperonospora urticae*.
P. urticae (Lib.) d By.: SEE *Pseudoperonospora urticae*.
Phoma nebulosa (Pers. ex Fr.) Berk.—Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
?Pseudoperonospora urticae (Lib.) Salmon & Ware, downy mildew. Wis. (2). Sometimes reported as *Peronospora urticae* (Lib.) d By., which, in part, is *P. debaryi* Salmon & Ware. Based on C.G.Shaw's study (Mycologia 41:197), apparently *Pseudoperonospora urticae* does not occur in the U.S. He found only one specimen of downy mildew extant although several specimens of supposed *Peronospora* on *Urtica* from Wis., Minn., Wash. were examined. He identifies the Pammel collection from Wis. as *Peronospora debaryi*.
Puccinia caricis (Schum.) Schroet. var. *urticata* (Kern) Arth. (O,I), rust. Occasional on (1), frequent on (2) from Mass. to Calif. and Wash.; also on other species in parts of this range and to Alaska. II and III on *Carex* spp.
Ramularia urticae Ces., leaf spot. Wyo. (1); Vt. to Tex., Calif., and Wash. (2); Utah, Wash. (3).
Sclerotinia sclerotiorum (Lib.) d By., stem rot. Calif. (3).
Septoria urticae Rob. ex Desm., leaf spot. Ill., Minn., Mont., S.Dak., Tex., Wis., Wyo. (2); La., Tex., Wash., Alaska (3).
S. urticaria Tharp—Tex. (3).

VALERIANACEAE

Centranthus

C. ruber (L.) DC., red-valerian, Jupiters-beard.
Perennial herb of southern Europe, grown for ornament.

Ramularia centranthi Brun., leaf spot. Calif.

Valeriana, valerian

(1) *V. edulis* Nutt., edible valerian, tobacco-root.
(2) *V. officinalis* L., common valerian, garden-heliotrope.

(3) Other species.

Perennial herbs, native to northern and western United States (1,3) or naturalized from Europe (2); grown for ornament and medicinal use, especially (2); some of the native species in the West are minor forage plants.

Erysiphe cichoracearum DC., powdery mildew. Colo. (1,3), Utah (1).
Puccinia commutata Syd. (O,I,III), rust. N.Y., Oreg. (3).
P. extensicola Plowr. var. *valerianae* Arth. (O,I), rust. Colo., N.Mex. (1); Utah (3). II and III on *Carex* spp.
P. valerianae Car. (II,III), rust. Alaska (3).
Ramularia centranthi Brun., leaf spot. Calif. (2).
R. eamesii Dearn. & House—N.Y. (3).
R. valerianae (Speg.) Sacc.—Mich. (2).
Rhizoctonia solani Kuehn, root rot. N.Y. (2).
Sclerotium delphinii Welch, stem rot. Conn., N.J. (2).
Septoria valerianae Sacc. & Fautr., leaf spot. Wis. (3).

Valerianella

V. radiata (L.) Dufr., beaked cornsalad.

Annual herb of the Eastern and Central States and southward; the related *V. olitoria* (L.) Poll., cornsalad, lambslettuce, of Europe, naturalized in the same range, is cultivated as a salad plant.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (species not designated).
Septoria valerianellae Miles, leaf spot. Miss.; Tex. (species not designated).
Synchytrium aureum Schroet., leaf gall. Miss.

VERBENACEAE

Callicarpa

C. americana L., French-mulberry, and *C. dichotoma* (Lour.) K. Koch, beautyberry.

C. americana a shrub of range 17,20,25,28,29, and 30; grown as an ornamental; *C. dichotoma*, a smaller shrub of eastern Asia, cultivated, and sometimes naturalized in southeastern United States.

Atractilina callicarpae Dearn. & Barth., on leaves. Fla.
Botryosphaeria callicarpae Cke. (*?B. ribis* Gross. & Dug.), on stems. Ga., S.C.
Cercospora callicarpae Cke., leaf spot. S.C. to Tex.
Coniothyrium callicarpae Cke., on stems. S.C.
Meliola cookeana Speg., black mildew. Fla., La., Tex.
Nectria cinnabarina Tode ex Fr., on stems. Ala.
Physalospora obtusa (Schw.) Cke. on stems. S.C.

Clerodendron, glorybower

Clerodendron spp.

Shrubs or small trees of China, cultivated as ornamentals in the Gulf States and California; other species are native in the West Indies.

Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md.
Septoria phlyctaenioides Berk. & Curt., leaf spot. S.C.

Duranta

D. repens L. (*D. plumieri* Jacq.), pigeonberry, golden-dewdrop, skyflower.

Shrub or small tree of range 11,17,32, and the West Indies; sometimes grown under glass.

Phyllachora fusicarpa Seaver, black leaf spot. Fla., P.R.
Sclerotium rolfsii Sacc., seedling blight. Fla.

Lantana, lantana

Lantana spp., especially *L. camara* L., *L. involucrata* L., and *L. montevidensis* (Spreng.) Briq., weeping, or trailing, lantana.

Hairy shrubs of tropical America: *L. camara* occurs in range 10,17,20,29,30, and also a source of dwarf garden forms cultivated for ornament, a weed in T. H.; *L. involucrata* occurs in range 17 and 30; *L. montevidensis* cultivated for ornament in the Far South.

Aecidium verbenae Speg. (O,I), rust. C.Z.
Alternaria sp., leaf spot. Tex.
Aphelenchoides fragariae (Ritz.-Bos) Christie, leaf nematode. N.J.
Cercospora lantanae Chupp, leaf spot. P.R.
Diatrypella lantanae Earle, on stems. Fla., P.R.
Fusarium sp., wilt. N.J.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meliola ambigua Pat. & Gaill., black mildew. C.Z., P.R.
M. cookeana Speg.—Fla., V.I.
Meloidogyne spp., root knot nematodes—Widespread.
Perisporina lantanae F.L.Stevens, on leaves. P.R.
Phyllosticta lantanae F.L.Stevens, on leaves. P.R. *P. lantanae* Pass. has priority.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (on *L. horrida* H. B. K.).
Physalospora fusca N.E.Stevens, on stems. T.H.
P. obtusa (Schw.) Cke.—Ala.
Pratylenchus pratensis (De Man) Filip., nematode disease. T.H.
Puccinia lantanae Farl. (III), rust. Fla., P.R., V.I.
Scleroderris lantanae Cash, on branches. T.H.
Septoria lantanae Garman, leaf spot. P.R.

Lippia

Lippia spp., especially *L. canescens* H. B. K., *L. citriodora* H. B. K., lemon-verbena, *L. lanceolata* Michx, fogfruit, and *L. ligustrina* (Lag.) Britt., whitebrush.

Native shrubs or herbs of southwestern United States to tropical America: *L. canescens* grown as a ground cover in the South and in California; *L. citriodora* cultivated in herb gardens and for its fragrant foliage; *L. ligustrina* sometimes planted for ornament.

Cercospora lippiae Ell. & Ev., leaf spot. Widespread (on *L. lanceolata*), Tex. (species not designated).
Cylindrosporium lippiae Heald & Wolf, leaf spot. Tex. (on *L. ligustrina*).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meliola lippiae Maubl., black mildew. Fla.
Meloidogyne sp., root knot nematodes.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Sclerotium rolfsii Sacc., southern blight. Calif. (on *L. canescens*).
Sphaceloma lippiae Baines & Cumm., anthracnose. Ind. (on *L. lanceolata*).

Stachytarpheta

Stachytarpheta spp.

Shrubs and herbs of tropical America, sometimes grown for ornament.

Cercospora papillosa Atk., leaf spot. P.R. (on *S. jamaicensis* (L.) Vahl).
C. stachytarphetae Ell. & Ev.—Fla., P.R.
Endophyllum stachytarphetae (P.Henn.) Whet. & Olive (III), rust. P.R. (on *S. cayennensis* (Rich.) Vahl); C.Z. (on *S. jamaicense*).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meliola glabroides F.L.Stevens, black mildew. P.R.
Meloidogyne sp., root knot nematodes. T.H. (on *S. dichotoma* (R. & P.) Vahl).
Puccinia urbaniana P. Henn. (III), rust. P.R., V.I.
MOSAIC—unidentified virus. T.H.; ?Fla. (on *S. jamaicensis*).

Tectona

T. grandis L., teak.

Tall tree of southeastern Asia, sometimes grown for ornament in T. H. and in the Far South; an important and valuable timber tree.

Cercospora tectoniae F.L. Stevens, leaf spot. T.H.

Verbena, verbena

I. Garden Species

Verbena hybrida Voss (*V. hortensis* Vilm.), garden verbena.

Cultigen derived from *V. teucroides* Gill. & Hook. and other species of South America; widely grown for ornament as a summer annual in the North and as a winter annual or perennial in the South.

Botrytis cinerea Pers. ex Fr., flower blight. Mass.
Erysiphe cichoracearum DC., powdery mildew. General.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Md.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Rhizoctonia solani Kuehn, root rot. N.Y.
Sclerotium bataticola Taub., charcoal stem rot. Okla.
Sphaerotheca humuli (DC.) Burr., powdery mildew. P.R.
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Pa.

II. Native or Naturalized Species

(1) *Verbena bipinnatifida* Nutt.
(2) *V. bracteata* Cav.
(3) *V. canadensis* (L.) Britton, clump verbena.
(4) *V. hastata* L., blue verbena, simplersjoy.
(5) *V. stricta* Vent.
(6) *V. urticifolia* L., white verbena.
(7) Other species.

Native or naturalized perennial herbs, widely distributed in the United States: (1,3) sometimes grown for ornament; (2,4,5,6,7) mostly weeds or wildlife-food plants; (4) a minor honey plant.

Ascochyta verbenae Siem., leaf spot. Wis. (5).
Cercospora septatissima Tracy & Earle—Miss. (7).
C. truncatella Atk.—Ala. (7).
C. verbenae-strictae Pk.—Ill., Kans. (5).
C. verbenicola Ell. & Ev., leaf spot. Tex. (1,7); Ala., La. (7).
Cuscuta arvensis Beyr. (=*C. pentagona* Engelm.), dodder. Okla. (7).
Erysiphe cichoracearum DC., powdery mildew. General (4,5,6); occasional (7).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. T.H. (7).
Phyllosticta texensis Seaver, leaf spot. Tex. (5).
P. verbenicola G.Martin—N.J. (4).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,7).
Plasmopara halstedii (Farl.) Berl. & de T., downy mildew. N.Mex. (7).
Puccinia aristidae Tracy (O,I), rust. Ariz. (7). II and III on *Distichlis* and *Aristida* spp.
P. vilfae Arth. & Holw. (O,I), rust. Nebr. (2); Okla. (3); Ind. to Okla. and S.Dak. (4,5,6); Kans., Mo. (7). II and III on *Sporobolus* spp.
Septoria verbenae Rob. ex Desm., leaf spot. Tex. (1); Idaho, Kans., S.Dak., and Wis. (2); Kans., La., Okla. (3); Vt. to Miss., Tex., and S.Dak. (4,5,6,7).
MOSAIC—unidentified virus. Iowa (6).

Vitex

V. agnus-castus L., chaste-tree, hemptree.

Shrub or small tree of southern Europe, having a strong aromatic odor; grown for ornament in zones 6 and 7.

Cercospora viticis Ell. & Ev., leaf spot. La., Okla., Tex.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

VIOLACEAE

Viola

I. Pansy

(1) *Viola tricolor* L., pansy, heartsease.

A cultigen of European origin derived from this species and probably others; an old garden flower.

(2) *V. cornuta* L., horned violet, bedding pansy.

Tufted perennial, native of southern Europe, also grown for ornament.

(3) *V. rafinesquii* Greene, field pansy.

Slender-stemmed, small-flowered plant, native in the Southeastern and Southern States.

Alternaria violae Gall. & Dorsett, leaf spot. N.J., N.Y., Pa. (1).
Aphanomyces sp. (*?A. euteiches* Drechs.), root rot, wilt. Md. (1).
Botrytis cinerea Pers. ex Fr., gray mold. Alaska (1).
Cercospora violae Sacc., leaf spot. Conn., Mich., N.Y., Tex., Wis. (1); Ind. (2).
Colletotrichum violae-tricoloris R.E.Sm., anthracnose. Maine to Fla., Ind., and Mich., also Wash. (1); Pa. (3).
Fusarium oxysporum Schlecht. (*F. violae* Wolf) root rot, wilt. Nebr., N.J., Tex., also ?Conn., Mich., N.Y., Ohio (1).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Meloidogyne spp., root knot nematodes. N.Y., Tex., T.H. (1).

Peronospora violae d By. (probably *Bremiella megasperma* (Berl.) G.W.Wils. but not confirmed), downy mildew. Ill., Miss., Nebr. (1); Ala., Miss. (3).
Phyllosticta rafinesquii H.W.Anderson, leaf spot. Ala., Ill. (3).
P. violae Desm.—Mich. (1).
Puccinia ellisiana Thuem. (O,I), rust. Kans., Nebr. (1). II and III on *Andropogon* spp.
P. violae (Schum.) DC. (O,I,II,III), rust. Conn., Fla., Kans., N.Dak., N.J., S.C. (1).
Pythium spp., damping-off, root rot. *P. debaryanum* Hesse is reported from Conn., Mo., N.J. (1); *P. mammilatum* Meurs and *P. ultimum* Trow from Calif. (1).
Ramularia agrestis Sacc., leaf spot. Oreg.
R. lactea (Desm.) Sacc.—Wash. (1).
Rhizoctonia solani Kuehn, root rot, damping-off. Del. Ill., Minn., N.Y. (1).
Sclerotium rolfsii Sacc., southern blight. Fla., Va. (1).
Sphaceloma violae Jenkins, spot anthracnose. Kans., Md., N.J. (1).
Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schlecht.) Salm., powdery mildew. Iowa, Kans., Wash. (1); Iowa (2).
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Conn. (1).
Urocystis kmetiana Magn., seed smut. Ark., Mo., Tenn. (3).
Uromyces andropogonis Tracy (O,I), rust. Conn. (1). II and III on *Andropogon* spp.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Calif. (1,2); Oreg., Tex. (1).
MOSAIC—unidentified virus, causing typical mottle in foliage and flower break. Md. [Western cucumber mosaic and cherry calico viruses cause flower break and leaf mottle in pansy in Calif.].

II. Violet

A. Cultivated Species

Viola odorata L., sweet violet, florists' violet.

Perennial herb of Europe and Asia, grown in many forms for ornament, chiefly under glass, or in the open in the South and in California.

Alternaria violae Gall. & Dorsett, leaf spot. Conn., Md., Tex.
Ascochyta violicola McAlp., leaf spot. Alaska.
Botrytis cinerea Pers. ex Fr., gray mold, wet rot. Md., Ohio, Alaska.
Bremiella megasperma (Berl.) G.W.Wils., downy mildew. Fla., N.J.
Cercospora granuliformis Ell. & Holw., leaf spot. Md.
C. violae Sacc.—Ala., Conn., Mich., Pa., Tex.
Colletotrichum violae-tricoloris R.E.Sm., anthracnose. Conn., Mass.
Fusarium oxysporum Schlecht. var. *aurantiacum* (Lk.) Wr. (*F. violae* Wolf), root rot. Fla., Miss., Ohio.
?Gloeosporium violae Berk. & Br., leaf spot. Miss.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Heterosporium sp., leaf spot (?secondary). Alaska.
Marssonina violae (Pass.) Magn., leaf spot. N.J.
Meloidogyne spp., root knot nematodes. N.J., Tex.
Phyllosticta violae Desm., leaf spot. Conn., Mass., N.Y.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Pleosphaerulina violae Nagornyi, on leaves. Ala.
Puccinia violae (Schum.) DC. (O,I,II,III), rust. Conn.
Ramularia lactea (Desm.) Sacc., leaf spot. Alaska.
Rhizoctonia solani Kuehn, root rot. Ill., N.Y.
Sclerotium rolfsii Sacc., southern blight. Ala., Ark., Md., Tex.
Sphaceloma violae Jenkins, spot anthracnose, scab. Fla., Ga., Md., Mass., N.J., N.Y., Pa., Tex., Va.
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Conn., Mass., Md., N.Y.

CURLY TOP—virus (*Ruga verrucosans* Carsner & Bennett, Beta virus 1 K.M.Sm.). Tex.

B. Native Species

(1) *Viola adunca* J. E. Smith
(2) *V. blanda* Willd., sweet white violet.
(3) *V. cucullata* Ait., marsh blue violet.
(4) *V. papilionacea* Pursh
(5) *V. pedata* L. (*V. pedata* var. *bicolor* Pursh), birdsfoot violet.
(6) *V. pubescens* Ait.
(7) Other species.

Many, mostly perennial, herbs of woodlands, prairies, and meadows throughout temperate North America; various species are grown in wild gardens and some are useful to wildlife.

Alternaria sp., leaf spot. Mass., Md., Mich., Minn., N.J., N.Y., Tex. (7).
A. violae Gall. & Dorsett—Ind. (3); Conn. to Ga., Tex., and Wis. (7).
Ascochyta violae Sacc. & Speg., leaf spot. Ind. (3); Iowa, Wis. (6); Pa. (7).
Bremiella megasperma (Berl.) G.W. Wils., downy mildew. Ill., Iowa, Minn. (7).
Centrospora acerina (Hartig) Newhall, leaf spot. Calif., Alaska (7).
Cercospora granuliformis Ell. & Holw., leaf spot. Maine to Ala., Okla., and S.Dak. (3,4,6,7).
C. difformis Tehon—Ill. (?4,7).
C. murina Ell. & Kell.—Ind., Kans. (7).
C. sororiae Tehon—Ill. (7).
C. violae Sacc.—Mass. to Fla., Tex., and N.Dak. (2,3,4,5,7).
C. violae-tricoloris Br. & Cav.—Ill. (on *V. ?missouriensis* Greene).
Cryptostictis violae Tehon & Daniels, leaf spot. Ill. (7).
Cylindrosporium violae Sacc., leaf spot. Mont. (7).
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Marssonina violae (Pass.) Magn., leaf spot. Ill., Iowa, N.Y. (3); N.Y. (4); Mass. to S.C., Iowa, and Minn. (7).
Meloidogyne spp., root knot nematodes. Fla. to Calif.; occurring northward (Mass., Ohio, R.I.); T.H. (7).
Phyllosticta nigrescens Bonar & W.B.Cooke, leaf spot. Calif. (7).
P. violae Desm.—N.Y. (3); Iowa (6); Mass. to Fla., Kans., and Minn.; Calif., T.H. (7).
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (7).
Pratylenchus pratensis (De Man) Filip., root nematode.
Puccinia effusa Diet. & Holw. (III), rust. Calif. (7).
P. ellisiana Thuem. (O,I), rust. Northeastern and North Central States (4,5); also to Ala., N.Mex., and Wyo. (7). II and III on *Andropogon* spp.
P. fergussoni Berk. & Br. (III), rust. Colo., Mont., Utah, Alaska (7).
P. violae (Schum.) DC. (O,I,II,III), rust. Throughout the U.S. (1,2,3,4,6,7).
Ramularia agrestis Sacc., leaf spot. Nebr., Oreg. (7).
R. ionophila J.J.Davis—Calif., Wis., Alaska (7).
R. lactea (Desm.) Sacc.—Colo., Miss., Mont. (7).
Rhizoctonia crocorum (Pers.) DC. ex Fr., root rot. Tex. (7).
R. solani Kuehn, root rot. Fla., Minn., Miss., N.Y. (7).
Sclerotium rolfsii Sacc. (*S. delphinii* Welch), southern blight. Va. to Fla., and Tex. (7). The form *del-*

phinii is reported also from Calif., Conn., N.Y., Vt. (7).

Scorias spongiosa (Schw.) Fr., sooty mold. Maine.

Septoria violae West. (*S. hyalina* Ell. & Ev.), leaf spot. Northeastern and North Central States (2,3,4,6); also to Fla., La., and Kans., also Alaska (7).

Sphaceloma violae Jenkins, spot anthracnose. Maine to Fla. and Miss. (3,4,5,7); Kans. (species not designated, probably (3)).

Sphaerotheca humuli (DC.) Burr., also var. *fuliginea* (Schlecht.) Salm., powdery mildew. Colo. (3); Calif., Colo., N.Dak., Oreg., Wis., Wyo. (7).

Synchytrium aureum Schroet., leaf gall. Wis. (6,7), N.Y. (7).

Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Conn. to Miss. and Ohio, also Kans. (7).

Urocystis violae (Sow.) Fisch. v. Waldh., leaf and stem smut. Calif., Minn., Tex., Utah, Alaska (7).

Uromyces andropogonis Tracy (O,I), rust. N.C., Tenn., W.Va. (4); Pa. (5); also to N.J. and Miss. (7). II and III on *Andropogon* spp.

VITACEAE

Ampelopsis

(1) *A. aconitifolia* Bunge, monkshood-vine. Slender, tendril-climbing, luxuriant vine; cultivated.

(2) *A. arborea* (L.) Koehne (*Cissus arborea* (L.) Desmoul.), peppervine. Bushy vine of range 17,20,25,27,28,29,30.

(3) *A. cordata* Michx. (*Cissus ampelopsis* Pers.), heartleaf ampelopsis. High-climbing vine of range 19,20,22,25,27, 28,29,30.

(4) Other species.

Cercospora arboriae Tharp, leaf spot. Tex. (2).

C. truncata Ell. & Ev., leaf spot. La. (3).

C. vitis (Lév.) Sacc., leaf spot. La. (2,3), Ala. (3).

Corticium koleroga (Cke.) Hoehn.: See *Pellicularia koleroga.*

Cuscuta compacta Juss., dodder. Fla. (2).

Gloeosporium ampelopsidis Ell. & Ev.: See *Phleospora ampelopsidis.*

Guignardia bidwellii (Ell.) Viala & Ravaz (*Phyllosticta ampelopsidis* Ell. & G. Martin, *P. labruscae* Thuem., and *P. viticola* (Berk. & Curt.) Thuem.), leaf spot. Miss., N.J. (2); widespread (4). Physiologically distinct from the form on *Vitis;* referred to as f. *parthenocissi* Luttrell.

Linospora psederae Dearn., leaf spot. W.Va. (4).

Nectria cinnabarina Tode ex Fr., dieback. Occasional (4).

Pellicularia koleroga Cke., thread blight. La. (2).

Phleospora ampelopsidis (Ell. & Ev.) Bub., leaf spot. Wis. (4).

Phyllosticta ampelopsidis Ell. & G.Martin, *P. labruscae* Thuem., and *P. viticola* (Berk. & Curt.) Thuem.: See *Guignardia bidwellii.*

Physalospora obtusa (Schw.) Cke. (*P. malorum* (Pk.) Shear)—Ala., Md. (4).

Plasmopara viticola (Berk. & Curt.) Berl. & de T., downy mildew. N.Y., Wis. (4).

Rhizoctonia crocorum (Pers.) DC. (*Helicobasidium purpureum* (Tul.) Pat.), root rot. Tex. (4).

Septogloeum ampelopsidis (Ell. & Ev.) Sacc.: See *Phleospora ampelopsidis.*

Septoria sp.—La. (2).

S. ampelopsidis Ell. & Ev.: See *Phleospora ampelopsidis.*

Tryblidiella rufula (Spreng.) Sacc.—Ga.

Tubercularia nigricans Bull. ex Sacc. (probably =*T. vulgaris* Tode ex Fr. (*Nectria cinnabarina* Tode ex Fr.)), dieback. N.H., Tex. (1).

Uncinula necator (Schw.) Burr., powdery mildew. Widespread (4).

Cissus

Cissus spp., especially *C. acida* L., and *C. incisa* (Nutt.) Desmoul., marine-ivy. Deciduous or evergreen climbing shrubs of southern United States and tropical America; some species are cultivated.

Aecidium mexicanum Diet. & Holw. (O,I), rust. Okla.

Cercospora arboriae Tharp—Tex.

C. viticola (Ces.) Sacc., leaf spot. La.

Cronartium wilsonianum Arth. (II,III), rust. West Indies.

Endophyllum circumscriptum (Schw.) Whet. & Olive (O,III), rust. West Indies.

Meliola merillii Syd., black mildew. C.Z., P.R.

Mykosyrinx cissi (DC.) G.Beck., smut. Fla., West Indies.

Omphalia flavida Maubl. & Rangel, leaf spot. P.R.

Phyllosticta cissicola Speg., leaf spot. Tex., P.R.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Parthenocissus

(1) *P. quinquefolia* (L.) Planch., Virginia-creeper, woodbine; including records for var. *engelmanni* Rehd., f. *hirsuta* (Donn) Fern., and *P. inserta* (Kerner) K. Fritsch (*P. vitacea* (Knerr) Hitchc.).

(2) *P. tricuspidata* (Sieb. & Zucc.) Planch., Boston ivy; including records for var. *lowii* Rehd.

Strong, high-climbing vines: (1) Range 11, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30; sometimes cultivated; (2) native of eastern Asia, has lustrous foliage, cultivated.

Botryosphaeria quercuum (Schw.) Sacc., on bark. W.Va. (1).

Cercospora ampelopsidis Pk., leaf spot. Widespread (1); Miss. (2).

C. psedericola Tehon, leaf spot. Ill., Tex. (1). (=*?C. viticola* (Ces.) Sacc.).

C. pustulata Cke.—Tex. (2).

Cladosporium sp. (*?herbarum* (Pers.) Lk.), dieback. N.J. (1).

C. herbarum (Pers.) Lk., dieback. Ind., N.J., Ohio, Pa. (2).

Coniothyrium fuckelii Sacc. (*Leptosphaeria coniothyrium* (Fckl.) Sacc.), stem canker. W.Va. (1).

Corticium koleroga (Cke.) Hoehn.: See *Pellicularia koleroga.*

C. solani (Prill. & Delacr.) Bourd. & Galz.: See *Pellicularia filamentosa.*

Diaporthe ampelopsidis (Ell. & Ev.) Ell., on stems. Mass., N.J., Ohio (1).

Elsinoë parthenocissi Jenkins & Bitanc., leaf scab. Fla., Mo., N.H., Pa. (1).

Gloeosporium ampelopsidis Ell. & Ev.: See *Phleospora ampelopsidis.*

Guignardia bidwellii (Ell.) Viala & Ravaz (*Phyllosticta ampelopsidis* Ell. & G.Martin, *P. labruscae* Thuem., and *P. viticola* (Berk. & Curt.) Thuem.), leaf spot. General (1); widespread (2). Physiologically distinct from the form on *Vitis;* referred to as f. *parthenocissi* Luttrell.

Haplosporella ?hedericola Speg.—?N.J. (2). See also *Sphaeropsis hedericola.*
Pellicularia filamentosa (Pat.) Rogers, stem rot. Conn. (2).
P. koleroga Cke., thread blight. Fla. (1).
Pezizella lythri (Desm.) Shear & Dodge, on stems. Va. (1).
Phleospora ampelopsidis (Ell. & Ev.) Bub., leaf spot. Ill., Iowa, Nebr., Wis. (1); Iowa (2).
Phomopsis viticola Sacc. var. *ampelopsidis* Grove, on stems. N.J. (1).
Phyllosticta ampelopsidis Ell. & G. Martin, *P. labruscae* Thuem., and *P. viticola* (Berk. & Curt.) Thuem.: See *Guignardia bidwellii.*
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2).
Physalospora obtusa (Schw.) Cke.—Ala., N.J. (1). See also *Sphaeropsis ampelopsidis.*
Plasmopara viticola (Berk. & Curt.) Berl. & de T., downy mildew. Ala., Iowa, Maine, Minn., N.Y., Tex., Wis. (1); N.J., Tex. (2).
Plowrightia neomexicana Earle, on stems. N.Mex. (1).
Rhizoctonia crocorum (Pers.) DC. (*Helicobasidium purpureum* (Tul.) Pat.), root rot. Tex. (1).
Septogloeum ampelopsidis (Ell. & Ev.) Sacc.: See *Phleospora ampelopsidis.*
Septoria ampelopsidis Ell. & Ev.: See *Phleospora ampelopsidis.*
Sphaeropsis ampelopsidis Daniels (*?Physalospora obtusa* (Schw.) Cke.), on stems. Ill. (1). This is a *Physalospora* according to Grove. *S. ampelopsidis* Cke. & Ell. has priority.
S. hedcrae Ell. & Ev.: See *Haplosporella ?hedericola.*
S. hedericola (Speg.) Sacc. (*?Physalospora obtusa*, q.v.), leaf spot. N.J. (2). Sometimes placed in *Haplosporella.*
Stagonospora heterospora Sacc., on stems. N.Y. (1).
Uncinula necator (Schw.) Burr., powdery mildew. General (1), Tex. (2).
Valsa ampelopsidis Ell.—N.J. (1).

Vitis, grape

I. Cultivated Species

Vitis vinifera L., European wine grape.

Cultivated varieties derived from *V. vinifera* L., the historical grape; a strong vine of medium height, the fruit a soft berry. Commercial cultivation in the United States restricted for the most part to California.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Ariz., Calif., Oreg., Wash.
Alternaria sp., fruit rot. Calif.
Armillaria mellea Vahl ex Fr., root rot. Calif., Wash.
Aspergillus niger v. Tiegh., bunch mold, black-mold rot. Calif.
Botrytis cinerea Pers. ex Fr., gray-mold rot, shoot blight. Calif., Oreg.
Cercospora vitis (Lév.) Sacc. (*C. viticola* (Ces.) Sacc.): See *Mycosphaerella personata.*
Cladosporium sp., green-mold rot. Calif.
Cryptosporella viticola Shear, dead-arm, branch necrosis. ?Calif.
Didymosphaeria sarmenti (Cke. & Harkn.) Berl. & Vogl. on twigs. Calif.
Diplodia viticola Desm., on canes. N.J.
Elsinoë ampelina (d By.) Shear (*Sphaceloma ampelinum* d By.), anthracnose. Tex.
Eutypella vitis. (Schw. ex Fr.) Ell. & Ev., on branches. N.C., Pa.
Gloeosporium ampelophagum (Pass.) Sacc.: See *Elsinoë ampelina.*
Glomerella cingulata (Ston.) Spauld. & Schrenk, ripe rot. Tex.
Guignardia bidwelli (Ell.) Viala & Ravaz, black rot. Ala., Mass., Nebr. A principal factor in the failure of European grape culture in the Eastern States. Vinifera grapes are susceptible to both *G. bidwellii* from bunch grapes and *G. bidwellii* f. *muscadinii* Luttrell.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Isariopsis clavispora (Berk. & Curt.) Sacc.: See *Mycosphaerella personata.*
Melanconium fuligineum (Scribner & Viala) Cav., bitter rot. Ga.
Meloidogyne spp., root knot nematodes. Ala., Calif., Ga.
Micropera ampelina Sacc. & Fairm., on branches. N.Y.
Mycosphaerella personata Higgins (*Cercospora vitis* (Lév.) Sacc.), leaf spot. Fla., Ga., Iowa, La., N.C. The conidial stage is also known as *Isariopsis clavispora* (Berk. & Curt.) Sacc.
Nectria viticola Berk. & Curt., on branches. Ala.
Penicillium spp., blue-mold rot. Cosmopolitan.
Pestalotia pezizoides de N., on stems. S.C.
Phymatotrichum omnivorum (Shear) Dug., root rot. Nev., Tex.
Physopella vitis (Thuem.) Arth. (II), rust. Fla., S.C., P.R.
Plasmopara viticola (Berk. & Curt.) Berl. & de T., downy mildew. Calif., Mich., N.Y. One of the principal factors in the failure of European grape culture in the Eastern States.
Pratylenchus sp., in roots. Calif.
Pseudovalsa viticola Ell. & Ev. (=*Thyridaria viticola* (Ell. & Ev.) Wehm.), on dead stems. Kans.
Sclerotinia sclerotiorum (Lib.) d By., shoot blight. Calif.
Uncinula necator (Schw.) Burr., powdery mildew. Calif., Iowa, Md., Idaho, Oreg., Wash.
Mosaic—unidentified virus. Calif.
Pierce's disease (Anaheim, California vine, or Emperor disease)—virus (*Morsus suffodiens* Holmes, Medicago virus 3 K.M.Sm.). Calif.
Black measles, "black mildew" (of fruit)—attributed to secondary effects of wood-rotting fungi in the trunk. Calif.
Little leaf—zinc deficiency. Calif.
Ring mildew (fruit blemish)—cause unknown. Calif.
Shot berry—defective pollination. Calif.
Sulphur dioxide injury (skin blanching, sunken caps)—SO^2 fumigation. Calif.
Water berry—physiological, possibly excessive bearing. Calif.

Vitis labrusca L., foxgrape.

Cultivated forms derived chiefly from *V. labrusca* L.; a strong climbing vine of range 22, 23,24,25,26,27; cultivated in zone 5; also grown with other native species in some localities.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Widespread.
Armillaria mellea Vahl ex Fr., root rot. Ark., Mo., Tex.
Botrytis cinerea Pers. ex Fr., gray-mold rot. Cosmopolitan.
Briosia ampelophaga Cav., leaf blotch. Tex.
Cercospora vitis (Lév.) Sacc.: See *Mycosphaerella personata.*
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. S.C. to Tex. and Okla. as *C. monadelpha* (Morg.) Sacc.
Coniothyrium diplodiella (Speg.) Sacc., white rot, dieback. Mass. to Fla. and Tex. Also known as *Coniella diplodiella* (Speg.) Petr. & Syd.: *Metasphaeria diplodiella* Berl., said to be its perfect stage, is not reported in this range.
Cryptosporella viticola Shear, dead-arm, branch necrosis. Widespread, chiefly in the Northeastern States; Iowa, Mich.

Cytospora vitis Mont., on twigs. Kans., Va. SEE ALSO *Valsa vitis.*
Daldinia concentrica (Bolt. ex Fr.) Ces. & de N. and *D. vernicosa* (Schw.) Ces. & de N., on stumps. Md., Va.
Diaporthe medusaea Nits., on stems. Va.
Diplodia viticola Desm., on twigs. Md., Mich., N.J., Va.
Elsinoë ampelina (d By.) Shear (*Sphaceloma ampelinum* d By.), anthracnose, bird's-eye rot. Widespread.
Endothia gyrosa Schw. ex Fr., on canes. N C.
Eutypella vitis (Schw. ex Fr.) Ell. & Ev. (*Eutypa viticola* Sacc.), on stems. Md., Mich.
Gloeosporium ampelophagum (Pass.) Sacc.: SEE *Elsinoë ampelina.*
Glomerella cingulata (Ston.) Spauld. & Schrenk, ripe rot. Widespread.
Guignardia bidwellii (Ell.) Viala & Ravaz, black rot of fruit, leaf spot. General. (=f. *euvitis* Luttrell on American bunch grapes and *V. vinifera.*)
Haplosporella fabaeformis (Pass. & Thuem.) Petr. & Syd. (*Sphaeropsis vitigena* Ell. & Ev.), on stems. Kans., Md., N.Y.
Hendersonia sarmentorum West., on twigs. N.J., Tex.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Hysterographium viticola (Cke. & Pk.) Rehm, on stems. Md., N.J., Va.
Isariopsis clavispora (Berk. & Curt.) Sacc.: SEE *Mycosphaerella personata.*
Leptothyrium pomi (Mont. & Fr.) Sacc. (*?Microthyriella rubi* Petr.), flyspeck. Pa., W.Va.
Macrophoma farlowiana (Viala & Sauv.) F. Tassi, on leaves. N.Y.
M. peckiana (Thuem.) Berl. & Vogl., on twigs. N.Y.
M. reniformis (Viala & Ravaz) Cav., on stems. Va.
Melanconium fuligineum (Scribner & Viala) Cav., bitter rot. Widespread.
Meloidogyne spp., root knot nematodes. N.C., Tex.
Mycosphaerella personata Higgins (*Cercospora vitis* (Lév.) Sacc., *Isariopsis clavispora* (Berk. & Curt.) Sacc.), leaf spot.—Widespread.
Nectria coccinea Pers. ex Fr., on canes following crown gall. Oreg.
Nummularia clypeus (Schw.) Cke., on stems. Ala.
Penicillium spp., blue mold. Cosmopolitan.
Pestalotia spp., fruit rot, secondary leaf and stem spot. Species reported include: *P. menezesiana* Bres. & Torr.—Conn., Fla.; *P. pezizoides* de N.—Md., N.J., Va.; and *?P. uvicola* Speg.—widespread.
Pezizella oenotherae (Cke. & Ell.) Sacc.—Va.
Phoma spp. Of numerous forms reported under this name, in association with fruit rot, leaf spot, and dieback, *P. uvicola* Berk. & Curt. (=*Guignardia bidwellii*) is most frequent; for other species, see *Macrophoma* and *Haplosporella.*
Phomopsis sp., on stems. Va. SEE ALSO *Diaporthe.*
Phyllosticta viticola (Berk & Curt.) Thuem. (*P. labruscae* Thuem.). Conidial stage of *Guignardia bidwellii,* q.v.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Nev., Tex.
Physalospora obtusa (Schw.) Cke., on canes. Mass. to Ga. and Mich.
Plasmopara viticola (Berk. & Curt.) Berl. & de T., downy mildew. General.
Polyporus spp., wood rot, chiefly of old trunks and stumps. Species reported include especially: *P. gilvus* Schw. ex Fr.—Tenn.; *P. hirsutus* Wulf. ex Fr.—Va.; *P. tulipiferus* (Schw.) Overh.—Va.; *versicolor* L. ex Fr.—Ala., Mich., Va., Wis.
Poria spp., wood rot. Species reported include: *P. isabellina* (Fr.) Overh.—Md.; *P. papyracea* (Schw.) Cke.—N.C., Va.; *P. versipora* Pers. ex Rom.—Mich., Va.; *P. viticola* (Schw.) Cke.—Md., Va.
Pratylenchus sp., in roots. Calif.
Pyrenochaeta vitis Viala & Sauv. (*?Rhytisma vitis* Schw.), on leaves. Fla., Mass., N.C., N.Y., Pa., Tex., Va.
Roesleria hypogaea Thuem. & Pass., root rot. N.Y. to Va., Mo., and Iowa.
Rosellinia necatrix (Prill.) Berl., white root rot. Ala., Ind., Mich., N.Y., Ohio.
Schizophyllum commune Fr., wood rot. Va.
Sclerotium bataticola Taub., root rot. Tex.
Septoria ampelina Berk. & Curt., leaf spot. N.Y., Tex., Va.
Sphaceloma ampelinum d By.: SEE *Elsinoë ampelina.*
Sphaeropsis spp.: SEE *Haplosporella, Macrophoma,* and *Physalospora.*
Stereum spp., wood rot. Species reported include: *S. purpureum* Pers.—Fla.; *S. umbrinum* Berk. & Curt.—Va.
Uncinula necator (Schw.) Burr., powdery mildew. General.
Valsa vitis (Schw.) Berk. & Curt. (*?Cytospora vitis* Mont.), on twigs. Pa.

II. Other Species

Vitis aestivalis Michx., summer grape, pigeon grape.

Tall, climbing vine of range 22,23,24,25,27,28,29; berries small, dry to juicy and sweet; cultivated in zone 5.

Alternaria sp., ?leaf spot. Fla.
Diplodia viticola Desm., on stems. Pa.
Elsinoë ampelina (d By.) Shear, anthracnose. Fla.
Eutypella vitis (Schw. ex Fr.) Ell. & Ev., on stems. Pa., S.C.
Guignardia bidwellii (Ell.) Viala & Ravaz, black rot. Widespread.
Helminthosporium sp., ?leaf spot. Fla.
Heterodera marioni (Cornu) Goodey: SEE *Meloidogyne* spp.
Macrophoma longispora (Thuem.) Berl. & Vogl., on stems. S.C
M. viticola (Cke.) Berl. & Vogl., on leaves. S.C.
Meloidogyne spp., root knot nematodes. Calif., Fla.
Phoma ampelina (Cke.) Sacc., on stems. Pa.
Phomopsis viticola Sacc., on stems. N.Y.
Phyllachora picea (Berk. & Curt.) Sacc., on stems. N.Y.
Physopella vitis (Thuem.) Arth. (II), rust. Fla.
Plasmopara viticola (Berk. & Curt.) Berl. & de T., downy mildew. Widespread.
Pyrenochaeta vitis Viala & Sauv., on leaves. Fla., Miss., S.C.
Rhabdospora mueggenburgii Sacc., on stems. La.
Septoria ampelina Berk. & Curt., leaf spot. N.Y., Va.
Uncinula necator (Schw.) Burr., powdery mildew. Widespread.

Vitis arizonica Engelm.: See *V. californica.*

Vitis baileyana Munson, possum grape, and *V. berlandieri* Planch., winter grape.

V. baileyana, a high-climbing shrub of range 25,27,28,29; eastern counterpart of *V. berlandieri. V. berlandieri,* a moderately climbing vine of range 11,17,20,30; berries juicy and pleasant tasting.

Coniothyrium berlandieri Viala & Sauv., leaf spot. Tex.
Corticium sp., root rot. Tex.
Meloidogyne sp., root knot nematodes. Tex.
Pyrenochaeta vitis Viala & Sauv., on leaves. Tex.

Vitis berlandieri Planch.: See *V. baileyana.*

Vitis californica Benth., California grape, and *V. arizonica* Engelm., canyon grape.

V. californica, a high-climbing shrub of range

1,2,3,4,10,11; fruit dry but pleasant tasting. *V. arizonica* a low shrub of range 9,10,11,16,17; the fruit black and pleasant tasting.

Dichomera viticola Cke. & Hark., on dead stems. Calif.
Fusicladium minutulum Sacc., on leaves. Oreg., Wash.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Calif.
Mycosphaerella personata Higgins (*Cercospora vitis* (Lév.) Sacc.), leaf spot. Calif.
Phoma vitis Bon., on stems. Calif.
Phyllosticta spermoides Pk., leaf spot. Calif.
Plasmopara viticola (Berk. & Curt.) Berl. & de T., downy mildew. Calif.
Septosporium heterosporum Ell. & Gall. (*?Cercospora roesleri* (Catt.) Sacc.), leaf spot. Calif.
Uncinula necator Schw. ex Burr., powdery mildew. Calif.

Vitis cinerea Engelm.: See *V. rupestris.*

Vitis munsoniana Simpson: See *V. rotundifolia.*

Vitis rotundifolia Michx., muscadine grape, and *V. munsoniana* Simpson, bird grape.

V. rotundifolia, strong vine of range 20,22, 25,28,29,30; the berries musky-flavored; cultivated in zone 5. *V. munsoniana,* a more slender vine of range 30 and 31; the berries small and numerous with no musky flavor.

Armillaria mellea Vahl ex Fr., root rot. Fla., Miss., N.C.
Botryosphaeria ribis Gross. & Dug., on canes. Fla., Ga.
Cercospora brachypus Ell. & Ev.: See *Mycosphaerella angulata.*
C. viticola (Lév.) Sacc.: See *Mycosphaerella personata.*
Cryptosporella viticola Shear, canker, dead-arm. Miss., N.C., S.C.
Cryptostictis inaequalis Tehon & Stout, on leaves. Ill.
Eutypella vitis (Schw. ex Fr.) Ell. & Ev. (*?E. fraxinicola* (Cke. & Pk.) Sacc.), on stems. Ala., Ga., N.C.
Guignardia bidwellii (Ell.) Viala & Ravaz f. *muscadinii* Luttrell, muscadine black rot. Del. to Gulf States, Mo., and Iowa. This form only on muscadine grapes; its pycnidial stage on living leaves is *Phoma* sp.; the ascigerous stage occurs on fallen leaves; causes scabby spots on fruit.
Melanconium fuligineum (Scribner & Viala) Cav., bitter rot, probably secondary rot. Fla., Ga.
Mycosphaerella angulata Jenkins (*Cercospora brachypus* Ell. & Ev.), angular leaf spot. Ala., Ga., Va.
M. personata Higgins (*Cercospora viticola* (Lév.) Sacc.), leaf spot. Ga., N.C.
Phyllosticta spermoides Pk.—Va.
Physalospora fusca N. E. Stevens, on stems. S.C.
P. obtusa (Schw.) Cke.—Ala., Ga.
P. rhodina (Berk. & Curt.) Cke.—S.C.
Physopella vitis (Thuem.) Arth. (II), rust. Ala., Fla.
Plasmopara viticola (Berk. & Curt.) Berl. & de T., downy mildew, (resistant). Ala., Mich.
Septoria ampelina Berk. & Curt., leaf spot. N.C., Tex.
Tryblidiella rufula (Spreng. ex Fr.) Sacc., on stems. Fla.
Uncinula necator (Schw.) Burr., powdery mildew. Iowa.

Vitis rupestris Scheele, sand grape, and *V. cinerea* Engelm., sweet winter grape.

V. rupestris, a shrub indigenous to range 11, 16,17,20,25,27,28,29; cultivated in zone 5. *V. cinerea,* a high-climbing shrub of range 11,17, 20,22,23,25,29,30; the berries sweet after frost.

Eutypella vitis (Schw. ex Fr.) Ell. & Ev., on canes. Okla.
Guignardia bidwellii (Ell.) Viala & Ravaz, black rot. Tex., W. Va.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* sp.
Meloidogyne sp., root knot nematodes. Miss.
Mycosphaerella personata Higgins, leaf spot. Kans.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Plasmopara viticola (Berk. & Curt.) Berl. & de T., downy mildew. Ill., Ind., La.
Uncinula necator Schw. ex Burr., powdery mildew. Ill.

Vitis vulpina L., frost grape.

Tall shrub, indigenous throughout the Eastern States and the Mississippi Valley, and also along streams to the Rocky Mountains; used chiefly for rootstocks but has also furnished horticultural varieties of table grapes; sometimes planted as an arbor or tree vine. Some authorities distinguish *V. cordifolia* Lam. and *V. riparia* Michx.

Ascochyta ampelina Sacc., on leaves. Wis.
Cercospora vulpina Ell. & Kell., leaf spot. Kans.
Eutypella vitis (Schw. ex Fr.) Ell. & Ev., on stems. N.J.
Gloeodes pomigena (Schw.) Colby, on stems. Ind.
Guignardia bidwellii (Ell.) Viala & Ravaz, black rot. General.
Haplosporella fabaeformis (Pass. & Thuem.) Petr. & Syd., on stems. Kans., Md., N.J., N.Y.
Helminthosporium siliquosum Berk. & Curt., on twigs. S.C.
Heterodera marioni (Cornu) Goodey: See *Meloidogyne* spp.
Hysterographium flexuosum (Schw. ex Fr.) Rehm and *H. vulvatum* (Schw.) Rehm, on stems. N.C.
Macrophoma farlowiana (Viala & Sauv.) F. Tassi, on leaves. N.Y.
Meloidogyne spp., root knot nematodes. Calif., Miss.
Mycosphaerella personata Higgins (*Cercospora vitis* (Lév.) Sacc.), leaf spot. Ga., Ill., La., Mich., Mo.
Myxosporium viticola Dearn. & House, on stems. N.Y.
Pestalotia pezoides de N., on stems. Kans., Md., S.C.
Pezizella oenotherae (Cke. & Ell.) Sacc. (*Sclerotiopsis concava* (Desm.) Shear & Dodge), on stems. Va.
Phyllosticta spermoides Pk., leaf spot. Ill., Kans., N.Y., Wis.
P. viticola (Berk. & Curt.) Thuem.: See *Guignardia bidwellii.*
Physalospora spp., on canes and branches. *P. fusca* N. E. Stevens—S.C.; *P. obtusa* (Schw.) Cke.—Va.
Plasmopara viticola (Berk. & Curt.) Berl. & de T., downy mildew. Widespread.
Polyporus versicolor L. ex Fr., wood rot. Nebr.
Pyrenochaeta vitis Viala & Sauv. (*?Rhytisma vitis* Schw.), on leaves. N.C., Pa., Tex.
Rhabdospora mueggenburgii Sacc., on stems. La.
Septoria ampelina Berk. & Curt., leaf spot. Iowa, S.C., Tex.
S. kellermaniana Thuem.—Kans.
Thyridium vitis Ell. & Ev., on stems. Kans.
Uncinula necator (Schw.) Burr., powdery mildew. Widespread.
Valsa vitis Schw. ex Berk. & Curt., on stems. Pa.

ZINGIBERACEAE

Zingiber

Z. officinale Roscoe, common ginger.
Perennial herb of tropical Pacific Islands, cultivated for its tuberous rootstocks, the source of commercial ginger.

Coniothyrium zingiber F. L. Stevens & Atienza, leaf spot. T.H.

Fusarium sp., rhizome rot. T.H.

Pythium butleri Subr., root rot. T.H.

ZYGOPHYLLACEAE

Larrea

L. tridentata (DC.) Coville, creosote-bush.
A shrub of range 9,10,11,16,17.

Omphalia sp., on leaves, ?blight. Calif.
Phoradendron californicum (Pursh) Nutt., mistletoe. Tex. to Calif.

Tribulus

T. terrestris L., caltrop, punctureplant.
Spreading herbaceous annual of waste places and open sandy ground from Florida to Texas to the Great Lakes States.

Rhizoctonia solani Kuehn, root rot. Tex.

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Scientific Names: Families and Genera

The entries in capitals are family names; those in lower case are genera. Parentheses ( ) are used to indicate synonyms and incidental references.

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Common Names

Common names of host plants are listed, together with the genera associated with each name. To avoid making the index unwieldy, groups such as the true lilies are for the most part, not itemized. However, some large or often-consulted groups are listed in detail. Where there are different common names for various species in a genus, they are listed. Parentheses indicate incidental references.

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LIST OF AUTHORS OF PLANT-PARASITE NAMES; RECOMMENDED ABBREVIATIONS

Some years ago a preliminary list of authors with recommended abbreviations was issued — Plant Disease Reporter 28:366–395. 1944. A revision of this list is presented here with such corrections and additions as have been called to our attention.

The names given are for the most part those of mycologists and plant pathologists, but a few names of phanerogamic botanists, virologists, nematologists, and bacteriologists are included, since some of their species concerned as plant parasites occur in this Handbook. Abbreviations of authors' names cited as part of the many host names occurring throughout this Handbook have not been considered in connection with this list.

Citation of authors' names "for purposes of precision" is covered by section 3 (articles 46–50 of the "International Code of Botanical Nomenclature" (Utrecht, 1956). These rules are official for the Department of Agriculture. Abbreviations of authors' names when considered desirable have been made in line with the suggestions of Recommendation 50 A.

The essentials of this recommendation are as follows: Authors' names put after names of plants are abbreviated, unless they are very short. For this purpose preliminary letters are suppressed and the first letters are given without any omission. If a name of one syllable is long enough to make it worthwhile to abridge it, the first consonants only are given; if the name has two or more syllables, the first syllable and the first letter of the following one are taken, or the two first when both are consonants. Christian names or accessory designations serving to distinguish two botanists of the same name are abridged in the same way. When it is a well-established custom to abridge a name in another manner, it is best to conform to it, e.g., L. for Linnaeus.

A consideration of the fairly extensive list of names will make it evident, however, that in the interests of clarity, and to avoid ambiguity, abbreviations cannot be employed as extensively as might otherwise be thought possible from the wording of Recommendation 50 A, or as they have been in practice heretofore.

In preparing the preliminary list the botanical catalog of the Department of Agriculture Library and publications such as "North American Flora," "American Men of Science," Lindau and Sydow's "Thesaurus," and Pritzel's "Thesaurus Literaturae Botanicae" were drawn on freely. Acknowledgment is made to H. W. Rickett, Bibliographer of the New York Botanical Garden, for his kindness in checking uncompleted entries with his biographical records and to W. W. Diehl of this Division for data taken from his files. Absence of biographical data indicates that the information is not available or that the person is still living.

Abbott, Ernest Victor	1899–	Abbott
Acharius, Erik	1757–1819	Ach.
Adam, David Bonar		Adam
Adams, James Fowler	1888–	Adams.
Adanson, Michel	1727–1806	Aderh.
Aderhold, Rudolph Ferdinand Theodor	1865–1907	Adams
Afzelius, Adam	1750–1837	Afzel.
Agardh, Carl Adolf	1785–1859	Agardh
Aggéry, Berthe Emma	1892–	Aggéry
Ahmad, Sultan		Ahmad
Ainsworth, Geoffrey Clough	1905–	Ains.
Ajello, Libero	1916–	Ajello
Albertini, Johannes Baptista von	1769–1831	Alb.
Alcock, Mrs. Nora Lillian		Alcock
Allen, Thomas Cort	1899–	Allen
Allescher, Andreas	1828–1903	Allesch.
Allington, William B.	1912–	Allington
Almeida, Floriano Paulo de		F. Alm.
Almeida, Jose Verissimo d'	1834–1915	Alm.
Altstatt, George E.	1905–	Altstatt
Alvarez Garcia, Luis A.	1903–	Alvarez Garcia
Ames, Lawrence Marion	1900–	Ames
Anastasia, Guiseppe Emilio	1870–1934	Anas.
Anderson, Frederick William	1866–1891	F. W. Anderson
Anderson, Harvey Warren	1885–	H. W. Anderson
Anderson, Paul Johnson	1884–	P. J. Anderson
Andrus, Charles Frederick	1906–	Andrus
Appel, Otto	1867–1952	Appel
Arcangeli, Giovanni	1840–1921	Arcang.
Archer, William Andrew	1894–	Archer
Arde, Walker Robert	1902–	Arde
Ark, Peter Alexander	1899–	Ark
Arnaud, Gabriel	1882–	Arn.
Arrhenius, Johan Pehr	1811–1889	Arrh.
Artari, Alexsandr Petrovich	–1924(?)	Artari
Arthaud-Berthet, J.	1875–1941	Arth.-Ber.
Arthur, John Morris	1893–	J. M. Arth.
Arthur, Joseph Charles	1850–1942	Arth.
Arx, J. Adolph von		Arx
Ascherson, Paul Friedrich August	1834–1913	Aschers.
Ashby, Sidney Francis	1874–	Ashby
Atienza, J. D.		Atienza
Atkinson, George Francis	1854–1918	Atk.
Auctores		Auct.
Auerswald, Bernhard	1818–1870	Auers.
Authors		Auth.
Avellar Brotero, Felix de.	*See* Brotero.	
Averna-Saccá, Rosario	1883–1951	Averna-Saccá
Ayers, Theodore Thomas	1900–	Ayers
Baccarini, Pasquale	1858–1919	Bacc.
Badham, Charles David	1806–1857	Badh.
Baeumler, Johann Andreas	1847–1903	Baeumler
Bagchee, Krishnadas		Bagchee
Baglietto, Francesco	1826–1916	Bagl.
Bagnis, Carlo	1854–1879	Bagnis
Bain, Douglas Cogburn	1908–	D. Bain
Bain, Samuel McCutcheon	1869–1919	Bain
Baines, Richard Cecil	1905–	Baines

Bainier, Georges	–1920	Bainier
Baker, Charles Fuller	1872–1927	C. Baker
Baker, Gladys Elizabeth	1908–	G. Baker
Baker, Kenneth Frank	1908–	K. Baker
Bakke, Arthur Lawrence	1886–	Bakke
Balbis, Giovanni Battista	1765–1831	Balbis
Balsamo-Crivelli Giuseppe	(fl. 1835–1869)	Balsamo
Bancroft, Claude Keith	1885–1919	Bancroft
Banker, Howard James	1866–1940	Banker
Banning, Mary Elizabeth	1832–1901	Banning
Barbarini,		Barbarini
Barbour, W. J.		Barbour
Barclay, Arthur	1852–1891	Barcl.
Barker, Bertie Thomas Percival	1877–1961	Bark.
Barla, Jean Baptiste	1817–1896	Barla
Barrett, James Theophilus	1876–1966	Barrett
Barrus, Mortier Franklin	1879–	Barrus
Barss, Howard Philipps	1885–	Barss
Barthelet, Jean Jules		Barthelet
Bartholomew, Elam	1852–1934	Barth.
Bartholomew, Elbert Thomas	1878–	E. T. Barth.
Bartsch, Alfred Frank	1913–	Bartsch
Bary, Heinrich Anton de	1831–1888	D By.
Bastian, Henry Charlton	1837–1915	Bast.
Bataille, Frédéric	1850–1946	Bat.
Batsch, August Johann Georg Carl	1761–1802	Batsch
Battarra, Giovanni Antonio	1714–1789	Batt.
Baudyš, Eduard	1886–1968	Baudyš
Bauhin, Caspar	1560–1624	C. Bauhin
Bauhin, Jean Johann	1541–1613	Bauhin
Bäumler. *See* Baeumler.		
Baxter, Dow Vawter	1898–1965	Baxter
Baxter, John Wallace		J. Baxter
Bayliss-Elliott, Jessie Sproat	1869–1957	Bayl.-Elliott
Beach, Walter Spurgeon	1890–	Beach
Beardslee, Henry Curtis	1865–1948	Beardslee
Beaumont, Albert	1901–	Beaum.
Beauverie, Jean Jules	1874–1938	Beauverie
Beauvois. *See* Palisot de Beauvois.		
Beccari, C.		Becc.
Beck von Mannagetta, Günther	1856–1931	G. Beck
Beckmann, Johann	1739–1811	Beckm.
Beeley, Fred		Beeley
Beeli, Maurice	1879–	Beeli
Beers, Alma Holland		Beers
Beijerinck, Martinus Willem	1851–1931	Beijer.
Bel, Jules		Bel
Bell, Hugh Philip	1889–	Bell
Bellynck, Auguste Alexis Adolphe Alexandre	1814–1877	Bellynck
Beltrani, Vito		Beltr.
Benatar, Rubens	1910–	Benatar
Bender, Harold Bohn	1902–	Bender
Bennett, Alfred William	1833–1902	A. W. Bennett
Bennett, Carlyle Wilson	1895–	Bennett
Bennett, Frederick Thomas	1884–19	F. T. Bennett
Bennett, James Lawrence	1832–1904	J. L. Bennett
Bentham, George	1800–1884	Benth.
Berdan, Helen Berenice (Slaght)	1901–	Berdan
Berenger, Giuseppe Adolfo de	1815–1895	Bereng.
Berg, Anthony	1888–1948	Berg
Bergamaschi, Giuseppe	1785–1867	Bergam.
Bergamaschi, Maria		M. Bergam.
Bergey, David Hendricks	1860–1937	Bergey
Berkeley, Miles Joseph	1803–1889	Berk.
Berkhout, Christine Marie		Berkhout
Berlese, Antonio	1863–1927	A. Berl.
Berlese, Augusto Napoleone	1864–1903	Berl.
Bernard, Charles Jean	1876–	Bernard
Bernard, Georges		G. Bernard
Berridge, Emily Mary	1872–1947	Berridge
Berry, Edward Wilber	1875–1945	Berry
Bertero, Carlo Giuseppe	1789–1831	Bert.
Berthet, Arthaud. *See* Arthaud-Berthet.		
Berthold, A.		A. Berth.
Bertnold, Gottfried Dietrich Wilhelm	1854–1937	Berth.
Bessey, Charles Edwin	1845–1915	Bessey
Bessey, Ernst Athearn	1877–1957	E. A. Bessey
Bethel, Ellsworth	1863–1925	Bethel
Beyrich, Heinrich Karl	1796–1834	Beyr.
Biedenkopf, Hermann	1870–	Bied.
Bier, John Ertel	1909–	Bier
Bigeard, René	1840–1917	Bigeard
Biggs, Rosemary Peyton	1912–	Biggs
Bijl, Paul Andries van der	1888–1939	Bijl
Billings, John Shaw	1838–1913	Billings
Biourge, Philibert Melchior Joseph Ehislam	1864–	Biourge
Bisby, Guy Richard	1889–1958	Bisby
Bitancourt, Agesilau Antonio	1894–	Bitanc.
Bivona-Bernardi, Antonio de	1774–1837	Biv.-Bern.
Bizzozero, Giacomo	1852–1885	Bizz.
Bjerkander, Clas	1735–1795	Bjerk.
Black, Lindsay MacLeod	1907–	Black
Blasdale, Walter Charles	1871–	Blasd.
Bliss, Donald Everett	1903–1951	Bliss
Bloxam, Andrew	1801–1878	Blox.
Bloxam, Richard Rowland	1798–1877	R. Blox.
Blume, Karl Ludwig von	1796–1862	Blume
Blumer, Samuel		Blumer
Blytt, Axel Gudbrand	1843–1898	Blytt
Boedijn, Karel Bernard	1893–1964	Boed.
Boewe, Gideon Herman	1895–	Boewe
Bohn, Guy Waston	1909–	Bohn
Boidin, A.		Boid.
Bolle, Pierette Cornelie	1893–1945	Bolle
Bollen, Walter Beno	1896–	Bollen
Bolley, Henry Luke	1865–1956	Bolley
Bolton, James	17 ?–1799	Bolt.
Boltshauser, Heinrich	1853–1899	Boltsh.
Bommer, Elisa Caroline (Destrée)	1832–1910	Bomm.
Bonar, Lee	1891–1977	Bonar
Boncquet, Pierre August	1882–	Boncquet
Bondar, Gregorio	1881–	Bondar
Bondartsev (Bondartzev) Apollinaris Semenovich	1877–1968	Bond.
Bondartzeva-Monteverde, Vera Nikolaevna (Bondarzewa-Monteverde, Vera N.)	1889–1944	Bond.-Mont.
Böning, Karl		Böning
Bonorden, Hermann Friedrich	1801–1884	Bon.
Borszczow, Elia Grigorievicz (Borscsov)	1833–1878	Borsc.
Borzi, Antonio	1852–1921	Borzi
Bosc, Louis Augustin Guillaume	1759–1828	Bosc
Boudier, Jean Louis Émile	1828–1920	Boud.
Boughey, Arthur Stanley		Boughey
Bourdot, Hubert	1861–1937	Bourd.
Bouriquet, Gilbert		Bour.
Boyd, Emma Sophia		Boyd

Boyer, Gaston		Boyer
Boyer, Leon		L. Boyer
Brandza, Marcel	1868–1934	Brandza
Braun, Alexander Carl Heinrich	1805–1877	A. Braun
Braun, Hans	1896–	Hans Braun
Braun, Harry	1895–	H. Braun
Breda de Haan, Jacob van	1866–1917	B. de Haan
Brefeld, Oscar	1839–1925	Bref.
Brenckle, Jacob Frederick	1875–1958	Brenckle
Bresadola, Giacomo	1847–1929	Bres.
Briard, Pierre Alfred	1811–1896	Briard
Brick, Carl	1863–1924	Brick
Briosi, Giovanni	1846–1919	Briosi
Brittlebank, Charles C.		Brittlebank
Britzelmayr, Max	1839–1909	Britz.
Brizi, Ugo	1868–	Brizi
Brockman-Jerosch, Heinrich	1879–1939	Brockm.
Brodie, Harold Johnston	1907– 89	Brodie
Brondeau, Louis de	1794–1859	Brond.
Brongniart, Adolphe Theodore	1801–1876	Brongn.
Brooks, Charles	1872–	C. Brooks
Brooks, Frederick Tom	1882–1952	F. T. Brooks
Broome, Christopher Edmund	1812–1886	Br.
Brotero, Felix de Avellar	1744–1828	Brot.
Brown, James Greenlief	1880–	J. G. Brown
Brown, Nellie Adalesa	1877–1956	N. A. Brown
Bruderlein, Jean		Bruderl.
Brunaud, Paul	–1903(?)	Brun.
Brunchorst, Jorgen	1862–1917	Brunch.
Bruner, Stephen Cole	1891–1953	Bruner
Brushi, Diana		Brushi
Bryan, Mary Katherine	1877–	Bryan
Bubák, Frantisĕk	1865–1925	Bub.
Buchanan, Robert Earle	1883–	Buch.
Bucholtz, Fedor	1873–1924	Bucholtz
Buchwald, Niels Fabritius	1898– 1986	Buchw.
Buddin, Walter	1890– 1962	Budd.
Buhrer, Edna Marie	1898–	Buhrer
Buisman, Christine Johanna	1900–1936	Buis.
Buller, Arthur Henry Reginald	1874–1944	Buller
Bulliard, Jean Baptiste François (Pierre)	1752–1793	Bull.
Bundy, William F.		Bundy
Burgwitz, Georg Konstantinovich	1889–	Burgw.
Burkholder, Walter Hagemeyer	1891–	Burkh.
Burlingham, Gertrude Simmons	1872–1952	Burl.
Burrill, Thomas Jonathan	1839–1916	Burr.
Burt, Catherine C.		C. C. Burt
Burt, Edward Angus	1859–1939	Burt
Burton, Mary Gwendolyn (Caldwell)	1917–	Burton
Büsgen, Moritz	1858–1921	Büsgen
Busse, Walter Karl Otto	1865–1933	Busse
Butler, Edwin John	1874–1943	Butl.
Butler, Ellys Theodora (Wodehouse)	1906–	E. Butl.
Buxbaum, Johann Christian	1693–1730	Buxb.
Caballero, Arturo	1877–1950	Cab.
Cain, Roy Franklin	1906–	Cain
Caldis, Panos Demetrius	1896–	Caldis
Caldwell, Ralph Merrill	1903–	Caldwell
Camara, Manuel (Emmanuele) de Sousa da	1872–1955	Camara
Campanile. *See* Rivera Campanile.		
Campbell, Leo	1894–	L. Campbell
Campbell, William Andrew	1906–	Campbell
Candolle. *See* de Candolle.		
Canonaco, A.		Canonaco
Carestia, Antonio	1825–1908	Car.
Carleton, Mark Alfred	1866–1925	Carl.
Carmichael, Dugald	1772–1827	Carmichael
Carne, Walter Merryn	1885–	Carne
Carpenter, Clarence Willard	1888–1946	Carpenter
Carsner, Eubanks	1891– 1979	Carsner
Carter, Carlos Newton		C. N. Carter
Carter, James Cedric	1905– 81	J. C. Carter
Carver, George Washington	1864(?)–1943	Carver
Cash, Edith Katherine	1890–	Cash
Caspary, Johann Xavier Robert	1818–1887	Casp.
Castagne, Jean Louis Martin	1785–1858	Cast.
Castellani, Ettore		Castell.
Cattaneo, Achille	1839–?	Catt.
Cavara, Fridiano	1857–1929	Cav.
Cesati, Vincenzo de	1806–1883	Ces.
Chaillet, Jean Frédéric de	1747–1839	Chaillet
Chamberlain, Donald William	1905–	Chamberlain
Chardon, Carlos Eugenio	1897– 1965	Chardon
Charles, Vera Katherine	1878–1954	Charles
Chenantais, Jules	1854–1942	Chenant.
Cheo, C. C.		Cheo
Chester, Frederick Dixon	1861–1943	Chester
Chester, Kenneth Starr	1906–	K. S. Chester
Chesters, Charles G. C.		Chesters
Chevallier, François Fulgis	1796–1840	Chev.
Child, Marion (Moss)		Child
Childs, Le Roy	1888–	Childs
Chilton, St. John Poindexter	1909–	Chilton
Chivers, Arthur Houston	1880–	Chivers
Choisy, Jacques Denis	1799–1859	Choisy
Chona, Behari Lall	1906–	Chona
Christensen, Clyde Martin	1905–	C. Christensen
Christie, Jesse Roy	1889–	Christie
Christopher, Warren Neil	1895–	Christopher
Chupp, Charles David	1886– 1967	Chupp 9/xi
Church, Margaret Brooks	1889–1940(?)	Church 76/
Cienkowski, Leo de	1822–1887	Cienk.
Ciferri, Rafael	1895– 1964	Cif. 12/2/64
Claessens, B.		Claess.
Clapp, Grace Lucretia	1881–	Clapp
Clara, Feliciano Mercado	1896–	Clara
Clark, Judson Freeman	1890–	Clark
Clausen, Roy Elwood	1891–	Clausen
Clements, Frederick Edward	1874–1945	Clem.
Clinton, George Perkins	1867–1937	Clint.
Clinton, George William	1807–1885	G. W. Clint.
Clusius, Carolus	1526–1609	Clusius
Cobb, Nathan Augustus	1859–1932	Cobb
Cocconi, Girolamo	1822–1904	Cocc.
Cockerell, Theodore Dru Alison	1866–1948	Cockerell
Coemans, Eugene		Coem.
Coerper, Florence Maud		Coerper
Cohn, Ferdinand Julius	1828–1898	Cohn
Coker, William Chambers	1872–1953	Coker
Colby, Arthur Samuel	1887–	Colby
Cole, John Rufus	1900–	Cole
Committee of the Society of American Bacteriologists		Comm. S. A. B.
Conant, Norman Francis	1908– 84	Conant
Conn, Harold Joel	1886–1952	Conn

Constantineanu, Joan C.		Const.
Cook, Melville Thurston	1869–1952	Cook
Cook, Orator Fuller	1867–1949	O. F. Cook
Cook, Walter Robert Ivimey	1902–1952	W. R. I. Cook
Cooke, Mordecai Cubitt	1825–1914	Cke.
Cooke, William Bridge	1908–91	W. B. Cke.
Coons, George Herbert	1885–	Coons
Copeland, Edwin Bingham	1873–	Copeland
Corbier, Louis	1850–1941	Corb.
Corda, August Carl Josef	1809–1849	Cda.
Cordier, François Simon	1797–1874	Cord.
Cordley, Arthur Burton	1864–1936	Cordley
Corner, Edred John Henry	1906 -	Corner
Cornu, Marie Maxim	1843–1901	Cornu
Costantin, Julien	1857–1936	Cost.
Cotton, Arthur Disbrowe	1879–1962	Cotton
Couch, John Nathaniel 12/10	1896–1986	Couch
Coulter, John Merle	1851–1928	Coult.
Coville, Frederick Vernon	1867–1937	Coville
Cragin, Francis Whittemore	1858–1937	Cragin
Cralley, Elza Monroe	1905–	Cralley
Cramer, Pieter Johann Samuel		Cramer
Crandall, Bowen Sinclair	1909–	Crandall
Crawshay, Richard		Craw.
Crossland, Charles	1844–1916	Crossl.
Crouan, Pierre Louis	1798–1871	Crouan
Crowell, Ivan Herrett	1904–	Crowell
Cruchet, Paul	1875–	Cruch.
Cuboni, Giuseppe	1852–1920	Cub.
Cugini, Gino	1852–1907	Cugini
Cummins, George Baker	1904–	Cumm.
Cunningham, David Douglas	1843–1914	D. D. Cunn.
Cunningham, Gordon Herriott	1892–1962	Cunn.
Currence, Troy Mansell	1897–	Currence
Currey, Frederick	1819–1881	Curr.
Currie, James Nimrod	1883–	Currie
Curtis, Moses Ashley	1808–1872	Curt.
Curtis, William	1746–1799	W. Curt.
Curzi, Mario	1898–1944	Curzi
Cutter, Victor Macomber	1917–1962	Cutter
Czerniaiev, Basil M.	1793–1871	Czern.
Dade, Harry Arthur	1895–1978	Dade
Dalbey, Nora Elizabeth	1888–1932	Dalbey
Dana, Bliss F.	1891–	Dana
Dangeard, Pierre Augustin Clement	1862–1947	Dang.
Daniels, Eve Ypin		Daniels
Darker, Grant Dooks	1898–1979	Darker 25 ix
Darnell-Smith, George Percy	1868–1942	Dar.-Sm.
Dassier de la Chassagne, Henri Gabriel Benoit	1748–1816	Dass.
Dastur, Jehangir Fardunji	1886–1952	Dast.
Davidson, Ross Wallace	1902–	Davidson
Davis, Alva Raymond	1887–	A. R. Davis
Davis, Benjamin Harold	1905–	B. H. Davis
Davis, John Jefferson	1852–1937	J. J. Davis
Davis, Lily H.		L. H. Davis
Davis, Marguerite Carolyn (Widmann)	1903–	M. C. Davis
Davis, William Harold	1876–1948	W. H. Davis
Dawson, Marion Lucile	1909–	Dawson
Day, William Robert		Day
Dearness, John	1852–1954	Dearn.
De Bary, Anton	1831–1888	d By.
De Candolle, Augustin Pyramus	1778–1841	DC.
Deighton, Frederick Claude	1903–	Deighton
De Jonge, A. E. van Hall	1871–1951	De Jonge
DeLacroix. *See* Lacroix.		
Delacroix, Edouard Georges	1858–1907	Del.
Delitsch, Heinrich		Delitsch
De Man, Johannes Govertus	1850-1930	De Man
Demaree, Juan Brewer	1885–	Demaree
De... etr.o, Charles Hermann	1845–1936	Dem.
Demidova, Zinaida Afanasevna		Demidova
De Notaris, Giuseppe	1805–1877	de N.
Derx, H. G.		Derx
De Seynes, Jules	1833–1912	De Seyn.
Desmazières, Jean Baptiste Henri Joseph	1786–1862	Desm.
Desvaux, Augustin Nicaise	1784–1856	Desv.
De Toni, Giovanni Battista	1864–1924	de T.
De Wildeman, Emile Auguste Joseph	1866–1947	de Wild.
Dick, Esther Amelia	1909–	Dick
Dickson, James J.	1738–1822	Dicks.
Diddens, Harmanna Antonia		Diddens
Diedicke, Hermann	1865–	Died.
Diehl, William Webster	1891–1978	Diehl
Dierckx, Fr.		Dierckx
Dietel, Paul	1860–1947	Diet.
Dietrich, Albert Gottfried	1795–1856	Dietr.
Dietrich, Heinrich August	(fl. 1852–1859)	H. Dietr.
Dillenius, Johann Jakob	1684–1747	Dill.
Dippenaar, B. J.		Dippenaar
Ditmar, L. P. Fr.		Ditm.
Dobrozrakova, Taisiia Leonidovna		Dobroz.
Docteurs van Leewen, William Maurice	1880–	Leewen
Dodge, Bernard Ogilvie	1872–1960	B. O. Dodge
Dodge, Carroll William	1895–1988	C. W. Dodge
Doidge, Ethel Mary		Doidge
d'Oliveira, Branquinho		d'Oliv.
Dominick, Tadeus		Dominick
Donk, Marinus Anton	1908–72	Donk
Doolittle, Sears Polydore	1890–1961	Doolittle
Dordević, Petor	–1947	Dordević
Dorogin, Georg Nikolaevich		Dorogin
Dorsett, Palemon Howard	1862–1943	Dorsett
Doty, Maxwell Stanford	1916–	Doty
Dowell, Ruth Isobel		Dowell
Dowson, Walter John	1887–1963	Dows.
Dozy, François	1807–1856	Dozy
Drayton, Frank Lisle	1892–1970	Drayt.
Drechsler, Charles	1892–1986	Drechs.
Drummond, Otavio de Almeida	1912–	Drummond
Duby, Jean Étienne	1798–1885	Duby
Ducomet, Vital		Ducom.
Dudley, William Russell	1849–1911	Dudl.
Dufour, Jean-Marie Léon	1780–187?	Duf.
Dufour, Léon	1862–1942	L. Duf.
Dufrenoy, Jean	1894–	Dufr.
Duggar, Benjamin Minge	1872–1956	Dug.
Duke, Maude M.		Duke
Dumée, Paul	1849–1930	Dumée
Dumortier, Barthélmy Charles Joseph	1797–1878	Dumort.
Dunegan, John Clymer	1898–	Dunegan
Dunlap, Albert Atkinson	1902–	Dunlap
Duplessis, Stefanus Johannes	1908–	Duplessis
Durand, Elias Judah	1870–1922	Durand
Durieu de Maisonneuve, Michel Charles	1796–1878	Dur.

Duss, Antoine	1840–1924	Duss
Duval, Charles Jeunet	1751–1828	Duval
Duval, N.	17 ?–18 ?	N. Duval
Earle, Franklin Sumner	1856–1929	Earle
Eddy, E. D.	1893–	Eddy
Edgerton, Claude Wilbur	1880–1965	Edg. 6.iv
Edson, Howard Austin	1875–	Edson
Edwards, Eric Thomas	1905–	Edwards
Egeland, John		Egel.
Ehrenberg, Christian Gottfried	1795–1876	Ehr.
Ehrhart, Friedrich	1742–1795	Ehrh.
Ehrlich, John	1907–	Ehrlich
Eidam, Michael Emil Howard	1845–1901	Eidam
Ekstrand, Harry	1892–	Ekstrand
Eliasson, Albin Gottfrid	1860–	Eliasson
Elliott, Charlotte	1883–1974	Elliott
Elliott, Jessie Sproat. *See* Bayliss-Elliott.		
Elliott, John Asbury	1887–1923	J. A. Elliott
Ellis, Don Edwin	1908–	D. Ell.
Ellis, Job Bicknell	1829–1905	Ell.
Ellrodt, Theodor Christian	1767–1804	Ellr.
Emmons, Chester Wilson	1900– 85	Emmons
Endlicher, Stephan Frederick Ladislaus	1804–1949	Endl.
Engelmann, George	1809–1884	Engelm.
Engler, Heinrich Gustav Adolf	1844–1930	Engl.
Englerth, George Henry	1907–	Englerth
English, William Harley	1911–	English
Enlows, Ella Morgan (Austin)	1884–	Enlows
Eriksson, Jakob	1848–1931	Eriks.
Eschweiler, Franz Gerhard	1796–1831	Eschw.
Essary, Samuel Henry	1870–1935	Essary
Evans, Alexander William	1868–	Evans
Evans, Arlyn Wayne		A. W. Evans
Evans, Iltyd Buller Pole	1879–1968	P. Evans
Everhart, Benjamin Matlack	1818–1904	Ev.
Ezekiel, Walter Naphtali	1901–	Ezekiel
Fabre, Jean Henri	1823–1915	Fabre
Fahmy, Tewfik		Fahmy
Fairman, Charles Edward	1856–1934	Fairm.
Falck, Richard	1873–1955	Falck
Faris, James Abraham	1890–1933	Faris
Farlow, William Gilson	1844–1919	Farl.
Farneti, Rodolfo	1859–1919	Farneti
Faull, Joseph Horace	1870–	Faull
Fautrey, F.		Fautr.
Favre, Jules		Favre
Fawcett, George Lorenzo		G. Fawc.
Fawcett, Howard Samuel	1877–1948	Fawc.
Fayod, Victor	1860–1900	Fayod
Fée, Antoine Laubert Apollinaire	1798–1874	Fée
Feltgen, Johann	1833–1904	Feltg.
Fennell, Dorothy Irene	1916–1977	Fennell
Fenner, Ellen Aline (Kempton)	1889–	Fenner
Ferdinandsen, Carl Christian Frederick	1879–1944	Ferd.
Ferraris, Teodoro	1874–1943	Ferr.
Ficinus, Heinrich David August	1782–1857	Ficinus
Field, Ethel Content (Tillotson)		Field
Filip'ev, Ivan Nikolaevich	1889–1937(?)	Filip.
Fingerhuth, Carl Anton		Fingerh.
Fink, Bruce	1861–1927	Fink
Fisch, Carl	1859– ?	Fisch
Fischer, Alfred	1858–1913	A. Fisch.
Fischer, Eduard	1861–1939	E. Fisch.
Fischer, George William	1906–	G. W. Fisch.
Fischer, Johann Carl	1804–1885	J. C. Fisch.
Fischer von Waldheim, Aleksandr Aleksandrovich	1839–1920	Fisch. v. Waldh.
Fisher, Eileen E.		E. Fisher
Fitzpatrick, Harry Morton	1886–1949	Fitzp.
Fleischhack		Fleischhack
Foëx, Étienne Edmond	1876–1944	Foëx
Foister, Charles Edward	1903–89	Foister
Foster, Arthur Crawford	1893–	Foster
Frandsen, N. O.		Frandsen
Frank, Albert Bernhard	1839–1900	Frank
Fraser, Lilian Ross	1903–87	L. Fraser
Fraser, William Pollock	1867–1943	Fraser
Freeman, Edward Monroe	1875–1954	Freeman
Fresenius, Johann Baptist Georg Wolfgang	1808–1866	Fres.
Fries, Elias Magnus	1794–1878	Fr.
Fries, Klas Robert Elias	1876–1966	R. E. Fr.
Fromme, Fred Denton	1886–	Fromme
Fron, Georges	1870–	Fron
Frost, Charles Christopher	1805–1880	Frost
Fuckel, Karl Wilhelm Gottlieb Leopold	1821–1876	Fckl.
Fujikuro, Yasaburô		Fujikuro
Fuknohi, T.		Fuknohi
Fukushi, Teikichi		Fukushi
Funck, Heinrich Christian	1771–1839	Funck
Gabotto, Luigi		Gab.
Gachet, Antoine Hippolyte	1798–1842	Gachet
Gaertner, Joseph	1732–1791	Gaertn.
Gaillard, Albert	1858–1903	Gaill.
Galloway, Beverly Thomas	1863–1938	Gall.
Galloway, Leslie Douglas		L. D. Gall.
Galzin, Amédée	1853–1925	Galz.
Gandara, Guillermo	1879–1939	Gandara
Ganguly, D.		Gang.
Garassini, Luiz A.		Garassini
Garcés Orejuela, Carlos	1915–	Garcés Or.
Gardner, Max William	1890–1979	Gardner
Garman, Philip	1891–	Garman
Garovaglio, Santo	1805–1882	Garov.
Garrett, Albert Osbun	1870–1948	Garrett
Gaudichaud-Beaupré, Charles	1789–1854	Gaud.
Gäumann, Ernst Albert	1893–5/12/1963	Gäum.
Gay, Claude	1800–1873	Gay
Genevier, L. Gaston	1831–1880	Gen.
Georgevitch, Pierre. *See* Dordevic.		
Gerard, William Ruggles	1841–1914	Gerard
Geyler, Hermann Theodor	1834–1889	Geyl.
Ghesquière, J.		Ghesq.
Giard, Alfred	1846–1908(?)	Giard
Gibson, William Hamilton	1850–1896	Gibson
Giddings, Nahum James	1883–	Gidd.
Giesenhagen, Karl Friedrich Georg	1860–1928	Gies.
Gilbert, Edward Jean		Gilb.
Gilbert, Edward Martinius	1875–1956	E. M. Gilb.
Gilkey, Helen Margaret	1886–1972	Gilkey (Mycologia 67, 19
Gill, Lake Shore	1900–	Gill
Gillet, Claude Casimir	1806–1896	Gill.
Gillot, François Xavier	1842–1910	Gillot
Glick, Perry Aaron	1895–	Glick
Gloyer, Walter Oscar	1886–	Gloyer
Gmelin, Johann Friedrich	1748–1804	Gmel.
Gobi, Christoph (Kristofer) Jakosolewitsch	1847–1919	Gobi
Godfrey, George Harold	1888–	Godfrey
Godkin, James	1891–	Godkin
Goidanich, Gabriel		Goid.
Gola, Giuseppe		Gola

Gomes da Luz, Carlos. *See* Luz, Gomez da.		
Gonnermann, Wilhelm	1806–1884	Gonn.
González Fragoso, Romualdo	1862–1928	Gonz. Frag.
Gooch, F. S.		Gooch
Goodding, Leslie Newton	1880–	Goodding
Goodey, Tom		Goodey
Gorenz, August Mark	1920–	Gorenz
Gorianinov, Pavel Fedorovich (Horaninow)	1796–1865	Gor.
Gould, Charles Jay Jr.	1912–	Gould
Graff, Paul Weidemeyer	1880–	Graff
Graves, Arthur Harmont	1879–	Graves
Gray, Elizabeth G.		E. G. Gray
Gray, Samuel Frederick	1766–1836	S. F. Gray
Graziani, Antoine	(fl. 1890–1910)	Graz.
Greef, Richard	1829–1892	Greef
Greene, Edward Lee	1842–1915	Greene
Greene, Henry Campbell	1904–1967	H. C. Greene
Gregory, Charles Truman	1887–	C. T. Greg.
Gregory, P. H.	1907–86	Greg. Philip Henry?
Grélet, Louis J. Rdo.	1870–1945	Grél.
Greville, Robert Kaye	1794–1886	Grev.
Griffin, Frederick Llewellin		Griffin
Griffiths, David	1867–1935	Griff.
Griffon, Edouard	1869–1912	Griffon
Grigorakis, Leon		Grigorakis
Grodsinsky, Leon	1908–	Grodsinsky
Grognot, Camille	1792–1869	Grog.
Grønlund, Carl Christian Howitz	1825–1901	Grønlund
Grossenbacher, John Gasser	1875–	Gross.
Grossmann, Helene		Grossman
Grout, Abel Joel	1867–1947	Grout
Grove, William Bywater	1848–1938	Grove
Groves, James Walton	1906–1970	Groves
Gruithuisen, F. R.	1821– ?	Gruith.
Guba, Emil Frederick	1897–	Guba
Guégen, Fernand Pierre J.	1872–1915	Guég.
Guepin, Jean Pierre	1779–1858	Guep.
Guillemin, Henri		Guill.
Guilliermond, Alexandre	1876–1945	Guillierm.
Güssow, Hans Theodor	1879–1961	Güssow
Guterman, Carl Edward Frederick	1909–1957	Guterman
Guyot, A. Lucien		Guyot
Haasis, Ferdinand Wead	1889–	F. W. Haasis
Hagborg, Walter Arnold Ferdinand	1908–	Hagb.
Hagelstein, Robert	1870–1945	Hagels.
Hagemann, Wilhelm		Hagem.
Hahn, Glen Gardner	1889–	Hahn
Hahn, Gotthold		G. Hahn
Hall, Constant Johann Jakob van	1875–	van Hall
Hall, John Galentine	1870–	J. G. Hall
Haller, Victor Albrecht von	1708–1777	Haller
Halsted, Byron David	1852–1918	Halst.
Hansen, Emil Christian	1842–1909	E. C. Hans.
Hansen, Hans Nicholas	1891–1960	Hans.
Hansford, Clifford Gerald	1900–1966	Hansf.
Hantzsch, Carl August	1825–1886	Hantzsch
Hanzawa, Jun		Hanz.
Hara, Kanesuke	1885–	Hara
Hard, Miron Elisha	1849–1914	Hard
Hardison, John Robert	1918–	Hardison
Hariot, Paul Auguste	1854–1917	Har.
Harkness, Harvey Wilson	1821–1901	Harkn.
Harris, Hubert Andrew	1909–	Harris
Harrison, Arthur Leslie	1905–	A. L. Harrison
Harrison, Travis Henry John	1901–	T. H. Harrison
Harter, Leonard Lee	1875–1952	Harter
Hartge, Lena (Armstrong)		Hartge
Hartig, Heinrich Julius Adolph Robert	1839–1901	Hartig
Hartley, Carl [Pierce]	1887–	Hartley
Harz, Carl Otto	1842–1906	Harz
Harzer, Carl August Friedrich	1784–1846	Harzer
Hasse, Clara H.	1880–1924(?)	C. Hasse
Hasse, Hermann Edward	1836–1915	Hasse
Hazslinszky, Friedrich August	1818–1896	Hazsl.
Heald, Frederick De Forest	1872–1954	Heald
Hedgcock, George Grant	1863–1946	Hedgc.
Hedges, Florence	1878–1956	Hedges
Hedwig, Johann	1730–1799	Hedw.
Hedwig, Romanes Adolf	1772–1806	Hedw. f.
Heim, Roger Jean	1900–79	Heim
Heiser, Dorothy Gaebler		Heiser
Hemmi, Takewo	1890–	Hemmi
Henning, Ernst Johan	1857–1929	E. Henn.
Hennings, Paul Christoph	1841–1908	P. Henn.
Henrici, Arthur Trautwein	1889–1943	Henrici
Henry, Arthur Wellesley	1896–	A. W. Henry
Henry, Berch Waldo	1915–	B. W. Henry
Hepting, George Henry	1907–	Hepting
Herbst, William	1833–1907	Herbst
Herpell, Gustav Jacob	1828–1912	Herp.
Herrera, Fortunato Luciano	1875–1945	Herr.
Herzberg, Paul	1865–	Herzb.
Hesler, Lexemuel Ray	1888–1977	Hesler
Hesse, Rudolf	1844–1912	Hesse
Heufler, Ludwig Joseph Ritter von	1817–1885	Heufl.
Hickman, C. James	1914–1980	Hickman
Higgins, Bascombe Britt	1887–	Higgins
Hildebrand, Alexander Anderson	1896–	A. A. Hildeb.
Hildebrand, Earl Martin	1902–	E. M. Hildeb.
Hildebrand, Friedrich Hermann Gustav	1835–1915	F. Hildeb.
Hilgard, Theodore Charles	1828–1875	Hilg.
Hillegas, Arthur Burdette	1907–	Hillegas
Hino, I.	1898–1985	Hino
Hipólito, O.		Hipólito
Hiratsuka, Naoharu	1873–1946	Hirat.
Hiratsuka, Naohide	1903–	Hirat. f.
Hiroë (Matsuura), Isamu	1905–	Hiroë
Hirschhorn, Elisa	1914–	Hirsch.
Hockey, John Frederick	1895–	Hockey
Hodson, Elmer Reed	1875–	Hodson
Hoehnel, Franz Xavier Rudolf von	1852–1920	Hoehn.
Hoerner, Godfrey Richard	1893–	Hoerner
Hoffmann, Georg Franz	1761–1826	Hoffm.
Hoffmann, Heinrich Carl Hermann	1819–1891	H. Hoffm.
Höhnk, Johann Willy Georg	1891–	Höhnk
Holl, C. Friederich		Holl
Holland, Dorothy Fitzgerald	1897–	Holland
Hollick, Charles Arthur	1857–1933	Hollick
Hollós, Lászlo	1859–1949	Hollós
Holmes, Francis Oliver	1899–	Holmes
Holmskjold, Theodor (Holms until 1781)	1731–1793	Holmsk.
Holway, Edward Willet Dorland	1853–1923	Holw.
Homma, Yasu. *See* Iguchi, Yesu.		
Honey, Edwin Earle	1891–1956	Honey
Hooker, William Jackson	1785–1865	Hook.
Hopkins, Edwin Fraser	1891–	E. F. Hopkins
Hopkins, J. C. F.	–1981	Hopkins
Horaninow, Paul Fedorowitsch. *See* Gorianinov.		

Hori, Shôtarô	1865–1945	Hori
Horne, Arthur Samuel		A. S. Horne
Horne, William Titus	1872–1944	Horne
Hornemann, Jens Wilken	1770–1841	Horn.
Horsfall, James Gordon	1905–	Horsfall
Höstermann, G.		Höstermann
Hotson, Hugh Howison	1916–	H. H. Hotson
Hotson, John Williams	1870–	Hotson
House, Homer Dolliver	1878–1949	House
Howe, Elliot Calvin	1828–1899	Howe
Howe, Marshall Avery	1867–1936	M. A. Howe
Howell, Thomas Jefferson	1842–1912	Howell
Huber, Glenn Anthony	1899–	Huber
Hubert, Ernest Everett	1887–1954	Hubert
Hudson, William	1730–1793	Huds.
Hughes, Stanley John	1918–	Hughes
Hulbary, Robert Louis	1916–	Hulbary
Hull, Kathleen L.		Hull
Hume, Hardrada Harold	1875–	Hume
Humphrey, Clarence John	1882–	C. J. Humph.
Humphrey, James Ellis	1861–1897	Humph.
Hunt, Nicholas Rex	1885–	Hunt
Hunter, Lydia Lillian Mary	1892–	Hunter
Hussey. A. M. (Mrs. Thomas John)	1820–1877	Hussey
Hutchins, Lee Milo	1888–	Hutchins
Hutchinson, Wesley Gillis	1903–	Hutch.
Ideta, Arata	1870–	Ideta
Iguchi (Homma), Yesu	1892–	Iguchi
Ikata, Suehiko		Ikata
Ikeya, Jûkichi		Ikeya
Imai, Sanshi	1900–9.i.76	Imai
Imle, Ernest Paul	1910–	Imle
Inui, Tamaki		Inui
Inzenga, Giuseppe	1815–1887	Inz.
Ishiyama, Totsuji		Ishiyama
Issatchenko, Boris Laurentiewicz	1871–	Issat.
Ito, Seiya	1883–1962	Ito
Jaap, Otto	1864–1922	Jaap
Jackson, Herbert Spencer	1883–1951	Jacks.
Jackson, Lyle Wendell Redverse	1900–	L. W. R. Jacks.
Jacky, Ernst	1874–	Jacky
Jacquin, Nicholas Joseph von	1727–1817	Jacq.
Jaczewski, Arthur Louis de	1863–1932	Jacz.
Jagger, Ivan Claude	1889–1939	Jagger
Jahn, Eduard	1871–1942	Jahn
James, Joseph Francis	1857–1897	James
Jamison, Clara Octavia (Weld)	1879–	Jamieson
Janczewski, Edouard von Glinka	1846–1918	Jancz.
Jauch, Clotilde	1910–	Jauch
Jeffers, Walter Fulton	1915–	Jeffers
Jehle, Robert Andrew	1882–	Jehle
Jenkins, Anna Eliza	1886–1972	Jenkins
Jenkins, Wilbert Armonde	1905–1956	W. A. Jenkins
Jennings, Herbert Spencer	1868–1947	Jennings
Jensen, Christian Nephi	1880–	C. N. Jens.
Jensen, Hans Laurits	1898–	H. L. Jens.
Jensen, Jens Ludwig	1836–1904	Jens.
Johan-Olsen, Olav. *See* Sopp, Johan-Olsen.		
Johanson, Carl Johan	1858–1888	Johans.
Johnson, Aaron Guy	1880–	A. G. Johnson
Johnson, Asa Emery	1825–1906	A. E. Johnson
Johnson, Edward Marshall	1896–	E. M. Johnson
Johnson, Howard Wilfred	1901–	H. W. Johnson
Johnson, James	1886–1952	J. Johnson
Johnson, Thomas	1863–	T. Johnson
Johnson, Thorvaldur	1897–1979	Th. Johnson
Johnston, George	1797–1855	G. Johnston
Johnston, John Robert	1880–	J. R. Johnston
Jones, Fred Ruel	1884–1956	F. R. Jones
Jones, Leon Killy	1895–1966	L. K. Jones
Jones, Lewis Ralph	1864–1945	L. R. Jones
Jones, Marcus Eugene	1852–1934	M. E. Jones
Jones, Philip Malory	1892–	P. M. Jones
Jordi, Ernst	1877–1833	Jordi
Jørgensen, Alfred Peter Carlslund	1848–1926	A. Jørg.
Jørgensen, Carl Adolph	1899–	C. A. Jørg.
Jørstad, Ivar	1887–1967	Jørst.
Josserand, Marcel	1900–	Josserand
Juel, Hans Oscar	1863–1931	Juel
Jump, John Austin	1913–	Jump
Junghuhn, Franz Wilhelm	1809–1864	Jungh.
Kabát, Josef Emanuel	1849–1925	Kab.
Kalchbrenner, Károly	1807–1886	Kalchb.
Kallenbach, Franz Joseph	1893–1944	Kallen.
Kanouse, Bessie Bernice	1889–1969	Kanouse
Kantshaveli, L.		Kant.
Karakulin, Boris Palladiyerrich	1888–1942	Karak.
Karling, John Sidney	1898–	Karling
Karsten, Hermann	1817–1908	H. Karst.
Karsten, Peter Adolf	1834–1917	Karst.
Kasai, Kampu		K. Kasai
Kasai, Mikio	–1944	Kasai
Kauffman, Calvin Henry	1869–1931	Kauff.
Kavina, Karel	1890–1948	Kav.
Kawai, Katsumi		Kawai
Kawakami, Takiya	1871– ?	Kawakami
Kawamura, Eikichi		E. Kawamura
Kawamura, Seiichi	–1946	S. Kawamura
Keay, Margaret A.		Keay
Keissler, Karl von	1872–1965	Keissl.
Kellerman, William Ashbrook	1850–1908	Kell.
Kelsey, Francis Duncan	1849–1905	Kelsey
Kendrick, James Blair	1893–	Kendr.
Kern, Frank Dunn	1883–	Kern
Khan, Azmatullah	1898–	A. Kahn
Khazanoff, Amram	1890–	Khaz.
Kheswalla, Kavasji Framaji		Kheswalla
Kickx, Jean Jacques	1803–1864	Kickx
Kidd, Mrs. Franklin (Mary Nest Owen)		Owen
Kiehly, T. B.		Kiehly
Kienholz, Jesse Reuben	1904–	Kienh.
Killermann, Sebastian	1870–1956	Kill.
Killian, Charles	1887–	Killian
King, Charlotte Maria	1864–1937	King
Kingma. *See* Van Beyma Thoe Kingma.		
Kirby, Robert Stearns	1892–	Kirby
Kirchner, Emil Otto Oskar	1851–1925	Kirch.
Kirchner, Leopold Anton	–1879	L. Kirch.
Kirschstein, Wilhelm	1863–1946	Kirsch.
Kita, G.		Kita
Klebahn, Heinrich	1859–1942	Kleb.
Klitzing, Heinrich		Klitzing
Kloecker (Klöcker), Albert	1862–1923	Kloecker
Klotz, Leo Joseph	1895–	Klotz
Klotzsch, Johann Friedrich	1805–1860	Klotzsch
Kniep, [Karl Johannes] Hans	1881–1930	Kniep
Kobel, Fritz	1896–	Kobel
Koernicke, Friedrich August	1828–1908	Koern.
Köhler, E.		Köhler
Komarov, Vladimer Leont'evich (Leontjevic)	1869–1939	Kom.
Koning, Henriette C.		Koning

Konrad, Paul	1877–1948	Konrad
Koorders, Sijfert Hendrick	1863–1919	Koord.
Körber, Gustav Wilhelm	1817–1885	Körber
Korf, Richard Paul	1925–	Korf
Körnicke. *See* Koernicke.		
Kostlan, A.		Kostlan
Kotila, John Ernest	1893–1951	Kotila
Kotte, Walter	1893–	Kotte
Kotthoff, Peter	1883–	Kotth.
Krampe, Oskar		Krampe
Krenner, Josef Andor		Krenner
Kreswalla, K. F.		Kreswalla
Krieger, Karl Wilhelm	1848–1921	Krieger
Krieger, Louis Charles Christopher	1873–1940	L. C. C. Krieger
Krombholz, Julius Vincenz von	1782–1843	Kromb.
Krueger, Wilhelm	1857–	Krueger
Kuehn, Julius Gotthelf	1825–1910	Kuehn
Kuehner (Kühner), Robert	1903–	Kuehner
Kulkarni, G. S.		Kulkarni
Kummer, Paul	(fl. 1871–1885)	Kumm.
Kunkel, Louis Otto	1884–1960	Kunkel
Kunth, Karl Sigismund	1788–1850	Kunth
Kuntze, Karl Ernst Otto	1843–1907	Kuntze
Kunze, Gustav	1793–1851	Kunze
Kunze, Johannes	?–1881	J. Kunze
Kuribayashi, Kazue	1902–	Kuribay.
Kusano, Shunsuke	1874– ?	Kus.
Kvashnina, E. S.		Kvashnina
La Billardiére, Jacques Julien Houton de	1755–1834	La Bill.
Labrousse, Francis Jean		Labr.
Lacroix, Louis Sosméne Veyron l'Abbe Sosthène	1818–1864	Lacroix
Lafferty, H. A.	1891–1954	Laff.
Lagerberg, Torsten	1882–	Lager.
Lagerheim, Nils Gustaf	1860–1926	Lagh.
Laibach, Friedrich		Laibach
Lamarck, Jean Baptiste Antoine Pierre Monnet de	1744–1829	Lam.
Lambert, C. R.		C. R. Lambert
Lambert, Edmund Bryan	1897–1971	E. B. Lambert
Lambert, François	1859–1940	F. Lambert
Lambotte, J. B. Ernest	1832–1905	Lambotte
Lamkey, Ernest Michael Rudolph	1890–	Lamkey
Lange, Jakob Emanuel	1864–1941	J. Lange
Lange, Johan Martin Christian	1818–1898	Lange
Langeron, Maurice	1874–1950	Langeron
Langlois, Auguste Barthélemy	1832–1900	Langl.
Lanzi, Matteo	1824–1908	Lanzi
Larsen, Poul	1864–1938	Larsen
Larson, Russell Harold	1904–	Larson
Lasch, Wilhelm Gottfried	1787–1863	Lasch
Lasnier, E.		Lasnier
Latham, Dennis Harold		Latham
Laubert, Karl Richard	1870–	Laub.
Lavrov, Nikolai Nicolaevich		Lavrov
Lazaro-Ibiza, Blas		Lazaro
Lea, Thomas Gibson	1785–1844	Lea
Leach, Julian Gilbert	1894–	Leach
Leach, Robert	1893–	R. Leach
Lebedeva, Lydia Alexsandrovna		Lebed.
Lebert, Hermann	1813–1878	Leb.
Ledingham, George Alek	1903–62	Led.
Lee, Henry Atherton	1894–	Lee
Lefebvre, Camille Leon	1905–	Lefebvre
Le Gal, Marcelle	1895–1979	Le Gal
Lehman, Samuel George	1887–	Lehman
Lehmann, Karl Bernhard	1858–	Lehm.
Leidy, Joseph	1823–1891	Leidy
Le Monnier, Alexandre Alexis George	1843– ?	G. Le Mon.
Le Monnier, Louis Guillaume	1717–1799	Le Mon.
Lendner, Alfred	1873–1948	Lendn.
Lentz, Paul Lewis	1918–	Lentz
Lenz, Harold Othmar	1799–1870	Lenz
Lenz, Lee Wayen	1915–	L. Lenz
Leonian, Leon Hatchig	1888–1945	Leonian
Letendre, Jean Baptiste Pierre, L'Abbe	1928–1886	Letendre
Letov, Aleksandr Sergeevich (Letow)	1904–	Letov
Letova. *See* Markova-Letova.		
Leuba, F.	1848–1910	Leuba
Léveillé, Joseph Henri	1796–1870	Lév.
Lewis, Isaac McKinney	1878–1943	I. M. Lewis
Leysser, Friedrich Wilhelm von	1731–1815	Leyss.
Libert, Marie Anne	1782–1865	Lib.
Liboschitz, Joseph	17(?)–1824	Liboschitz
Lieneman, Catharine	1899–	Lieneman
Limber, Donald Philips	1894–	Limber
Lind, Jens Vilhelm August	1874–1939	Lind
Lindau, Gustav	1866–1923	Lindau
Lindblad, Matts Adolf	1821–1899	Lindbl.
Linder, David Hunt	1899–1946	Linder
Lindgren, Sven Johan	1810–1949	Lindgren
Lindner, Paul	1861–1945	Lindner
Lindquist, Juan Carlos	1899–	Lindquist
Lindroth, Johan Ivar (later Liro)	1872–1943	Lindr. = Liro
Linford, Maurice Blood	1901–1960	Linford
Ling, Lee	1911–	Ling
Ling-Young		Ling-Young
Linhart, György	1844–1925	Linh.
Link, George Konrad Karl	1888–	G. Lk.
Link, Johann Heinrich Friedrich	1767–1851	Lk.
Linn, Manson Bruce	1908–	Linn
Linné, Carl von (Linnaeus)	1707–1778	L.
Liro, Johan Ivar (see also Lindroth)	1872–1943	Liro
Lister, Arthur	1830–1908	List.
Lister, Gulielma	1860–1949	G. List.
Litschauer, Viktor	1879–1939	Litsch.
Litwinow (Litwinov), Dimitri Ivanovich	1854–1929	Litw.
Lloyd, Curtis Gates	1859–1926	Lloyd
Lobik, Alexis Iulianovich		Lob.
Lohman, Marion Lee	1903–	Lohman
Lohwag, Heinrich	1884–1945	Lohw.
Lombard, Frances Faust	1915–	Lombard
Long, William Henry	1867–1947	Long
Longyear, Burton Orange	1868–	Longyear
Lönnegren, August Valfrid	1842–1904	Lönnegren
Loos, Walter		Loos
Lorentz, Paul Günther	1835–1881	Lorentz
Lorenz, Rolland Carl	1904–	Lorenz
Lorinser, Friedrich Wilhelm	1817–1895	Lorinser
Loudon, John Claudius	1783–1843	Loudon
Lovejoy, Ruth Ellen Harrison	1882–	Lovejoy
Lowe, Josiah Lincoln	1905–	Lowe
Lucand, Jean Louis	1821–1896	Lucand
Ludwig, Clinton Albert	1886–1941	C. A. Ludwig
Ludwig, Friedrich	1851–1918	F. Ludwig
Lüdi, Werner	1888–	Lüdi
Luijk, Abraham van	1874–	v. Luijk

Luttrell, Everett Stanley	1916–88	Luttrell
Lutz, Louis		Lutz
Luz, Carlos Gomes da	1871–1952	Luz
Lynge, Bernt	1884–1942	Lynge
Lyon, Harold Lloyd	1879–1957	Lyon
McAlpine, Daniel	1848–1932	McAlp.
Macbride, Thomas Huston	1848–1934	Macbr.
Macchiati, L.		Macchiati
McClain, R. L.		McClain
McClellan, Wilbur Dwight	1914–	McClellan
McClintock, James Albertine	1889–	McClintock
McColloch, Lacy Porter	1907–	McColloch
McCulloch, Lucia	1873–1955	McCull.
McDougall, Walter Byron	1883–	McDougall
Machacek, John Emil	1902–	Machacek
McIlvaine, Charles	1840–1909	McIlv.
MacKay, Alexander Howard	1848–1929	MacKay
Mackie, William Wylie	1873–	Mackie
McKinney, Harold Hall	1889–	McK.
MacMillan, Conway	1867–1929	MacM.
Macoun, James Melville	1862–1920	Macoun
McRae, William	1878–1952	McRae
McWhorter, Frank Paden	1896–	McWhorter
Maffei, Siro Luigi	1879–	Maf.
Magnaghi, Angelo		Magnaghi
Magnus, Paul Wilhelm	1844–1914	Magn.
Magnusson, Adolf Hugo	1885–	Magnusson
Magrou, Joseph	1883–1951	Magrou
Mains, Edwin Butterworth	1890–23/12/68	Mains
Maire, Louis		L. Maire
Maire, René Charles Joseph Ernest	1878–1949	Maire
Major, Thomas Grant	1898–	Major
Malbranche, Alexandre Françoise	1818–1888	Malbr.
Malencon, J. L. Georges	1885–1953	Malencon
Maloit, J. C.		Maloit
Mangin, Louis Alexandre	1852–1937	Mang.
Manns, Thomas Franklin	1876–1954	Manns
Manter, Harold Winfred	1898–	Manter
Marchal, Elie	1839–1923	El. Marchal
Marchal, Émile Julius	1871–1942	Em. Marchal
Marchand, Louis	1807–1943	Marchand 8/
Marchionatto. Juan B.	1896–1955	Marchionatto
Maresquelle, Henri J.		Maresquelle
Marignoni, G. B.		Marig.
Markova-Letova, Marie Federovna	1901–	Mark. Let.
Marshall, Nina Lovering	1861–	Marshall
Martin, George	1827–1886	G. Martin
Martin, George Hamilton	1887–	G. H. Martin
Martin, George Willard	1886–1971	Martin 11-IX-71
Martin, Weston Joseph	1917–	W. J. Martin
Martindale. Isaac Comly	1842–1893	Martindale
Martius, Heinrich von	1781–1831	H. Mart.
Martius, Karl Friedrich Philipp von	1794–1868	Mart.
Martyn, Eldred Bridgeman	1903–90	Martyn
Mason, Edmund William	1890–1975	Mason
Massalongo, Abramo Bartholomeo	1824–1860	A. Massal.
Massalongo, Caro Benigno	1852–1925	Massal.
Massee, George Edward	1850–1917	Mass.
Massey, Louis Melville	1889–	Massey
Matruchot, Louis	1863–1921	Matr.
Matsumoto, Hiroyoshi		H. Matsu.
Matsumoto, Takashi		T. Matsu.
Matsuura, Isamu. *See* Hiroë.		
Matthews, Velma Dare	1904–1958	Matthews
Mattirolo, Oreste	1856–1947	Matt.
Mattuschka, Heinrich Gottfried	1734–1779	Mattusch.
Matz, Julius	1886–	Matz
Maublanc, André	1880–1958	Maubl.
May, Curtis	1898–	May
Mayor, Eugene	1877–	Mayor
Mayr, Heinrich	1856–1911	Mayr
Medlar, Edgar Mathias	1887–1956	Medlar
Meehan, Frances		Meehan
Mehrlich, Ferdinand Paul	1905–	Mehrlich
Meier, Fred Campbell	1893–1938	Meier
Meinecke, Emilio Pepe Michael	1869–1957	Meinecke
Melhus, Irving E.	1881–1969	Melhus
Melin, Johannes Botwid Elias	1889–	Melin
Mendoza, Jose Miguel		Mendoza
Mérat, Francois Victor	1780–1851	Mérat
Mercer, W. B.		Mercer
Metcalf, Haven	1875–1940	Metcalf
Meurs, Abraham	1904–	Meurs
Meyen, Franz Julius Ferdinand	1804–1840	Meyen
Meyer, Georg Friedrich Wilhelm	1782–1856	Meyer
Michaux, André	1746–1802	Michx.
Micheli, Pier' Antonio	1679–1737	Micheli
Middleton, John Tylor	1912–	Middleton
Migula, Walter	1863–1938	Mig.
Milbrath, David Gallus	1880–	Milb.
Milbrath, John	1909–	J. Milb.
Miles, Lee Ellis	1890–1941	Miles
Milesi, Marco		Milesi
Millard, Wilfrid Arthur	1880–	Millard
Miller, Julian Howell	1890–1961	J. H. Miller
Miller, J. K.		J. K. Miller
Miller, Lee Wallace	1904–	L. W. Miller
Miller, Paul William	1901–	P. W. Miller
Miller, Vera M.		V. M. Miller
Millspaugh, Charles Frederick	1854–1923	Millsp.
Minden, Max D. von	1871–	Mind.
Miquel, Friedrich Anton Wilhelm	1811–1871	Miq.
Mirande, Marcel	1864–1930	Mirande
Mitra, Manoranjan	1895–1942	Mitra
Miura, Michiya		Miura
Mix, Arthur Jackson	1888–1956	Mix
Miyabe, Kingo	1860–1951	Miy.
Miyake, Ichiro	1881–1964	I. Miyake
Miyake, Tsutome	1880–1921	Miyake
Moeller, Friedrich Alfred Gustav Jobst (Möller)	1860–1922	Moell.
Moesz, Gustav	1873–1946	Moesz
Molkenboer, Julian Hendrick	1816–1854	Molk.
Molliard, Marin	1866–	Moll.
Montagne, Jean Pierre François Camille	1784–1866	Mont.
Moore, Justin Payson	1841–1923	J. P. Moore
Moore, William Dewey	1897–	W. D. Moore
Morgan, Andrew Price	1836–1907	Morg.
Morini, Fausto		Mor.
Morse, Elizabeth Eaton	1864–1955	Morse
Mougeot, Jean Baptiste	1776–1858	Moug.
Mounce, Irene (Stewart)	1894–	Mounce
Mouton, Victor		Mout.
Mueller, Ferdinand Jacob Heinrich von	1825–1896	F. Muell.
Mueller, Julius Heinrich Hans	1855–1912	J. Muell.
Mueller, Karl	1817–1870	K. Muell.
Mueller, Otto Fridric	1730–1784	O. F. Muell.
Mueller, Wilhelm	1884–	W. Muell.
Muhlenberg, Gotthilf Henry Ernest	1753–1815	Muhl.
Muller, Albert Stanley	1901–	Muller
Müller, Jean (Müller, Argov)	1828–1896	Müll.-Argov
Münch, Ernst	1876–	Münch

G. Métrod 1883-1961

Mundkur, Bhalchendra Bhavanishankar	1896–1952	Mund.
Munn, Mancel Thornton	1887–	Munn
Murashkinsky, K. E.		Murash.
Murphy, Hickman Charles	1902–	Murphy
Murray, Thomas Jefferson	1891–	Murray
Murrill, William Alphonso	1869–1957	Murr.
Nagatomo, Isamu		Nagatomo
Nagornyi, P. (Nagornyj)		Nagornyi
Nakata, Kakurgorô	1886–1939	Nakata
Nakata, N.		N. Nakata
Namyslowski, Boleslaw	1882–1929	Namysl.
Nannfeldt, John Axel	1904– 85	Nannf.
Nannizzi, Arturo	1877– 1961	Nann.
Nattrass, Roland Marshall	1895–	Nattrass
Naumann, Arno	1862–1932	Naumann
Naumov, Nikolai Alexsandrovich	1888–	Naum.
Nawaschin, Sergiei Gavrilovich (Navashin)	1857–1930	Nawaschin
Neal, David Carleton	1890–	Neal
Neergaard, Pierre Paul Ferdinand Mourier	1907– 87	Neerg.
Nees von Esenbeck, Christian Gottfried Daniel	1776–1858	Nees
Nees von Esenbeck, Theodor Friedrich Ludwig	1787–1837	T. Nees
Neger, Friedrich Wilhelm	1868–1923	Neger
Neil, Cornelius Bernardus	1897–	Neil
Nelson, Aven	1859–1952	A. Nels.
Nelson, Ray	1893–	R. Nels.
Nestler, Christian Gottfried	1778–1832	Nestl.
Neuhoff, Walther		Neuh.
Neuman, Julius John		Neuman
Newton, George Albert	1879–	Newton
Nicolas, Gustave	1879–	Nicolas
Nielsen, Peter	1829–1897	Niels.
Niessl von Mayendorf, Gustav	1839–1919	Niessl
Nishida, Toji	1874–1927	Nish.
Nisikado, Yosikazu	1892–	Nisikado
Nitschke, Theodor Rudolf Joseph	1834–1833	Nits.
Noack, Fritz	1863–	Noack
Noble, Mary		Noble
Nobles, Mildred Katherine	1903–	Nobles
Nolla, Jose Antio Bernabé	1902–	Nolla
Norton, John Bitting Smith	1872–	Norton
Nose, Tadayosi		Nose
Notaris, Giuseppe de	1805–1877	de N.
Noulet, Jean Baptista	1802–1890	Noulet
Novoseleva, E. D. (Nowasselowa)		Novos.
Nowakowski, Leon		Nowak.
Nowell, William	1880–	Nowell
Nuesch, Emil		Nuesch
Nuttall, Lawrence William	1857–1933	L. W. Nutt.
Nuttall, Thomas	1786–1859	Nutt.
Nylander, Fredrik	1820–1880	F. Nyl.
Nylander, William	1822–1899	Nyl.
Obregon-Botero, Rafael	1909–	Ob.-Botero
Oeder, Georg Christian Edler von	1728–1791	Oed.
Oersted. *See* Ørsted.		
O'Gara, Patrick Joseph	1872–1927	O'Gara
Okabe, Norio		Okabe
Olive, Edgar William	1870–	Olive
Olive, Lindsay Shepherd	1917– 87	L. Olive
Oliveira, Branquinho d'		d'Oliv.
Olson, Alver J.		Olson
Olson, Mary E.		M. E. Olson
Onuma, Fusaji		Onuma
Opatowski, Wilhelm	1810–1838	Opat.
Opiz, Philipp Maximilian	1787–1858	Opiz
Orejuela, Carlos Garces		Orejuela
Orishimo, Yoshinobu	1881–	Orish.
Orr, Leslie Wayne	1902–	Orr
Ørsted, Anders Sandoë	1816–1872	Ørsted
Orton, Clayton Roberts	1885–1955	Orton
Osner, George Adin	1888–	Osner
Ostenfeld, Carl Emil Hansen	1873–	Ostenfeld
Osterwalder, Adolf	1872–	Osterw.
Otth, Gustav Heinrich	1806–1874	Otth
Otto, Johann Gottfried	1761–18 ?	Otto
Oudemans, Cornelius Antoon Jan Abraham	1825–1906	Oud.
Overeem, Caspar van	1893–1927	v. Overeem
Overholts, Lee Oras	1890–1946	Overh.
Owen, Mary Nest (Mrs. Franklin Kidd)		Owen
Padwick, G. Watts	1909–	Padw.
Paine, Frederick Sylvanus	1883–	F. S. Paine
Paine, Sydney Gross	1881–1937	Paine
Palisot de Beauvois, Ambroise Marie François Joseph	1752–1820	Beauv.
Palliser, Helen Letitia		Palliser
Palm, Björn Torvald	1887–	Palm
Palmer, Julius Auboineau	1840–1899	Palmer
Pammel, Louis Hermann	1862–1931	Pam.
Paoli, Guido		Paoli
Pape, Heinrich	1891–	Pape
Parisi, Rosa		Parisi
Parker, Charles Stewart	1882–1950	Parker
Parker, John Bernard	1870–	J. B. Parker
Pascher, Adolph A.	1881–1945	Pascher
Passerini, Giovanni	1816–1893	Pass.
Patouillard, Narcisse Théophile	1854–1926	Pat.
Patterson, Flora Wambaugh	1847–1928	Patterson
Paul, Hermann	1876–	H. Paul
Paulet, Jean Jacques	1740–1826	Paul.
Pavarino, Giovanni Luigi	1867–1937	Pav.
Paxton, Glen Ernest	1896–	Paxton
Pazschke, Franz Otto	1843–1922	Paz.
Peck, Charles Horton	1833–1917	Pk.
Peglion, Vittorio	1873–	Pegl.
Peirce, Alan Stanley	1909–	Peirce
Penzig, Otto Albert Julius	1856–1929	Penz.
Percival, John	1863– 1949	Perc.
Person, Lee Homer	1904–	Person
Persoon, Christiaan Hendrik	1761–1836	Pers.
Petch, Thomas	1870–1948	Petch
Petersen, Henning Eiler	1877–	Petersen
Peterson, Alvah	1888–	Peterson
Pethybridge, George Herbert	1871–1948	Pethyb.
Petrak, Franz	1886– 1973	Petr. 9 x 73
Petri, Lionello	1875–1946	Petri
Peyl, Josef		Peyl
Peyritsch, Johann J.	–1887	Peyritsch
Peyronel, Beniamino	1890–	Peyronel
Pezzolato		Pezzolato
Phillips, William	1822–1905	Phill.
Phoebus, Philipp	1804–1880	Phoebus
Picbauer, Richard	1886–	Picb.
Piccone, Antonio	1844–1901	Piccone
Piemeisel, Frank Joseph	1891–1925	Piemeisel
Pierce, Newton Barris	1856–1916	Pierce
Pilát, Albert	1903– 1974	Pilát 2 xi 03 – 29 v
Pine, Lev		Pine
Pinoy, Pierre Ernest	1873–1948	Pinoy
Piper, Charles Vancouver	1867–1926	Piper
Pirone, Pascal Pompey	1907–	Pirone

Plakidas, Antonios George	1895–	Plakidas
Ploettner, Traugott	1853–1923	Ploettn.
Plowright, Charles Bagge	1849–1910	Plowr.
Plunkett, Orda Allen	1897–	Plunkett
Poeppig, Eduard Friedrich	1798–1868	Poepp.
Poetsch, Ignaz Sigismund	1823–1884	Poetsch
Poiret, Jean Louis Marie	1755–1834	Poir.
Poiteau, Pierre Antoine	1766–1854	Poit.
Pole Evans, I. B. *See* Evans, Pole.		
Politis, Jean		Politis
Pollacci, Gino	1872–1963	Poll.
Pollack, Flora Green		F. Pollack
Pollock, James Barkley	1863–1934	Pollock
Pope, Seth Alison	1911–	Pope
Porte, William Solomon	1891–	Porte
Posey, Gilbert Bradley	1891–	Posey
Potebnia, Audrej A.	1870–1919	Poteb.
Potter, Alden Archibald	1884–	A. A. Potter
Potter, Michael Cresse	1858–1947	M. C. Potter
Pound, Roscoe	1870–	Pound
Povah, Alfred Hubert William	1889–	Povah
Prantl, Karl Anton Eugen	1849–1893	Prantl
Presl, Karl Boriwag	1794–1852	Presl
Presley, John Thomas	1906–	Presley
Preuss, C. G. Traugott	?–1855	Preuss
Price, William Conway		Price
Prillieux, Edouard Ernest	1829–1915	Prill.
Pringle, Cyrus Guernsey	1838–1911	Pringle
Pringsheim, Nathanael	1823–1894	Pringsh.
Prinsen-Geerligs, Hendrik Coenraad	1864–	Prin.-Geerl.
Pritchard, Frederick John	1874–1931	Pritchard
Pugsley, A. T.		Pugsley
Pursh, Frederick	1774–1820	Pursh
Puttemans, Arsène	1873–1937	Putt.
Quélet, Lucien	1832–1899	Quél.
Rabenhorst, Gottlieb Ludwig	1806–1881	Rab.
Raciborski, Maryan	1863–1917	Rac.
Rader, William Ernest	1916–	Rader
Rafinesque-Schmaltz, Constantine Samuel	1783–1840	Raf.
Ragunathan, C.		Ragun.
Ramakrishnan, Taracad Subromania		Ramak.
Ramsbottom, John	1885–1971	Ramsb.
Ramsey, Glen Blaine	1889–	Ramsey
Rand, Frederick Vernon	1883–	Rand
Rands, Robert Delafield	1890–	Rands
Rangel, Eugenio	1877–1953	Rangel
Rankin, William Howard	1888–	Rankin
Ranojević, Nikola		Ranoj.
Raper, Kenneth Bryan	1908–	Raper
Rathay, Emerich	1845–1900	Rathay
Rathschlag, Heinz		Rathschl.
Rau, Eugene Abraham	1848–1932	Rau
Raunkiaer, Christen Christiansen	1860–1938	Raunk.
Ravaz, Louis Etienne	1863–1937	Ravaz
Ravenel, Henry William	1814–1887	Rav.
Ravn, Frederik Kølpin	1873–1920	Ravn
Ray, William Winfield	1909–	Ray
Rayss, Tscharna	1890–1965	Rayss
Rea, Carleton	1861–1946	Rea
Rea, Paul Marshall	1878–1948	P. M. Rea
Reade, John Moore	1877–1937	Reade
Rebentisch, Johann Friedrich	1772–1810	Reb.
Reddick, Donald	1883–1955	Reddick
Reddy, Charles Steven	1887–	Reddy
Reed, George Mathew	1878–1956	G. M. Reed
Reed, Howard Sprague	1876–1950	H. S. Reed
Reed, Minnie		M. Reed
Reess, Max Ferdinand Friedrich	1845–1901	Reess
Reeves, Enoch Lloyd	1901–	Reeves
Regel, Edward August von	1815–1892	Regel
Rehm, Heinrich	1829–1916	Rehm
Reichardt, Heinrich Wilhelm	1835–1885	Reichardt
Reichert, Israel G.		Reich.
Reinke, Johannes	1849–1931	Reinke
Reinke, Johannes	1829–1916	J. Reinke
Reinking, Otto August	1890–	Reinking
Relhan, Richard	1754–1823	Relh.
Remsberg, Ruth Elizabeth (Honey)	1906–	Remsberg
Requien, Esprit	1788–1851	Requien
Rex, George Abraham	1845–1895	Rex
Rhoads, Arthur Stevens	1893–	Rhoads
Richon, Charles Edouard	1820–1893	Richon
Rick, Johann	1869–1946	Rick
Ricken, Adalbert	1851–1921	Ricken
Ricker, Percy Leroy	1878–	Ricker
Riess, H.	1809–1875	Riess
Riker, Albert Joyce	1894–	Riker
Ritzema Bos, Jan	1850–1928	Ritz.-Bos
Rivera Campanile, Giulia		Campanile
Rivolta, Sebastiano	(fl. 1872–1887)	Riv.
Roark, Eugene Washburn	1894–1918	Roark
Robak, Hakan		Robak
Roberge, Michael Robert	?–1864	Rob.
Roberts, Daniel A.		D. A. Roberts
Roberts, John William	1882–1957	Roberts
Robertson, N. F.		Robertson
Robinson, Benjamin Lincoln	1864–1935	Robinson
Rodway, Leonard	1854–1936	Rodw.
Rogers, Donald Philip	1908–	Rogers
Rogerson, Clark Thomas	1918–	Rogerson
Rohde, J.		Rohde
Rohde, Theo		T. Rohde
Röhling, Johan Christoph	1757–1813	Röhling
Roldan, Emiliano F.		Roldan
Rolland, Léon Louis	1841–1912	Rolland
Romagnesi, Henri	1912–	Romag.
Romell, Lars Gunnar	1854–1927	Rom.
Roques, Joseph	1792–1850	Roques
Rose, Dean Humboldt	1878–	Rose
Rosella, Etienne		Rosella
Rosen, Harry Robert	1889–	Rosen
Rosenbaum, Joseph	1887–1925	Rosenb.
Rostafinski, Josef Thomas von	1850–1928	Rost.
Rostkovius, Friedrich Wilhelm Theophil	1770–1848	Rostk.
Rostowzew (Rostovtzev) Semen (Simon) Ivanovich	?–1916	Rostow.
Rostrup, Frederik Georg Emil	1831–1907	Rostr.
Rostrup, Ove	1864–1933	O. Rostr.
Roth, Albrecht Wilhelm	1757–1834	Roth
Rothers, Boris	1890–	Rothers
Roumeguère, Casimir	1828–1892	Roum.
Rousseau, Mariette Hannon	?–1926	Rouss.
Roussel, Henri François Anne de	1748–1818	Roussel
Routien, John Broderick	1913–	Routien
Roze, Ernesto	1833–1900	Roze
Rudolph, Bert Alexander	1889–1953	Rudolph
Rudolphi, Friedrich Karl Ludwig	1801–1849	Rudolphi
Rudolphi, Karl Asmunt	1771–1832	K. Rudolphi
Ruehle, George Dewey	1898–	Ruehle
Ruggieri, Gaetano		Rugg.
Ruhland, Eugen Otto Willy	1878–	Ruhl.

Rumbold, Caroline Thomas	1877–1949	Rumbold
Rutgers, Abraham Arnold Lodewijk	1884–	Rutgers
Ryan, Ruth Winifred (Sister Mary Hilaire)	1899–	Ryan
Rydberg, Per Axel	1860–1931	Rydb.
Ryker, Truman Clifton	1908–	Ryker
Sabouraud, Raymond Jacques	1864–1938	Sabour.
Saccardo, Domenico	1872–	D. Sacc.
Saccardo, Francesco		F. Sacc.
Saccardo, Pier Andrea	1845–1920	Sacc.
Sackett, Walter George	1880–	Sackett
Sadebeck, Richard Emil Benjamin	1839–1905	Sadeb.
Saito, Hidesaku	1960	H. Saito
Saito, Kendo	1878– ?	K. Saito
Salmon, Ernest Stanley	1871-1959	Salm.
Sandstede, Heinrich	1859–1951	Sand.
Sandu-Ville, Costantin	–1969	Sandu
Sanford, Guthrie Brown	1890–	Sanford
Sanwal, B. D.		Sanwal
Sardiña, Juan Rodriquez		Sardiña
Sartoris, George Bartholomew	1896–1949	Sartoris
Sartory, Auguste	1881–1950	A. Sartory
Sartory, René		R. Sartory
Saunders, William Wilson	1809–1879	Saunders
Sauvageau, Camille	1861–1936	Sauv.
Savastano, Luigi Salvatore	1853– ?	Sav.
Savile, Douglas Barton Osborne — Alice	1909– 1905-1970	Savile (i-ii) Olga
Săvulescu, Trajan (Traian)	1889 – 1963	Săvul. (29 March)
Sawada, Kaneyoshi		Saw.
Scalia, Giuseppe		Scalia
Schaeffer, Jacob Christian	1718–1790	Schaeff.
Schaeffer (Schäffer), Julius	1882–1944	J. Schaeff.
Schaffnit, Johannes Ernst Christian Otto	1878– 1964	Schaff.
Schellenberg, Hans Conrad	1872–1923	Schellenb.
Schenk, Bernhard	1833–1893	Schenk
Scherfell, Aladar		Scherfell
Schiedermayr, Karl B.	1818–1895	Schied.
Schilbersky, Károly	1863–1935	Schilb.
Schinz, Hans	1858–1941	Schinz
Schlechte, Friedrich		Schlechte
Schlechtendahl, Diedrich Franz Leonhard von	1974–1866	Schlecht.
Schleicher, Johann Christoph	1768–1834	Schleicher
Schmidt, Albert		A. Schm.
Schmidt, Johann Carl (Karl)	1793–1850	Schm.
Schnabl, Johann Nepomuk	1853–1899	Schnabl
Schnegg, Hans		Schnegg
Schneider, Albert	1863–1928	A. Schneid.
Schneider, Wilhelm Gottlieb	1823–1889	W. G. Schneid.
Schneider-Orelli, Otto	1880–	O. Schneid.
Schofield, Joseph Robert	1868–1928	Schofield
Schrader, Heinrich Adolph	1767–1836	Schrad.
Schrank, Franz Paula von	1747–1835	Schrank
Schrenk, Hermann von	1873–1953	Schrenk
Schroeter, Joseph	1837–1894	Schroet.
Schubert, Carl		Schubert
Schultz, Eugene S.	1884–	E. S. Schultz
Schultz, Karl Friedrich	1765–1837	Schultz
Schulzer von Müggenberg, Stephen	1802–1892	Schulz.
Schumacher, Heinrich Christian Friederich	1757–1830	Schum.
Schwabe, Samuel Heinrich	1799–1875	Schwabe
Schwartz, E. J.		Schwartz
Schwarz, Marie Beatrice	1898–	Schwarz
Schweinitz, Lewis David von	1780–1834	Schw.
Scopoli, Giovanni Antonio	1723–1788	Scop.
Scribner, Frank Lamson	1851–1938	Scribn.
Seaver, Fred Jay	1877–	Seaver
Secretan, Louis	1758–1839	Secr.
Seeler, Edgar Viguers	1908–	Seeler
Semadeni, Francesco Ottavio		Semadeni
Serbinow, Ivan L'rovich (Serbinow)	1872–1950	Serbinow
Serrano, Felicisimo B.		Serrano
Servazzi, Ottone		Servazzi
Setchell, William Albert	1864–1943	Setch.
Seymour, Arthur Bliss	1859–1933	Seym.
Seynes, Jules de	1833–1912	De Seyn.
Shanor, Leland	1914–	Shanor
Shaw, Charles Gardner	1917–	C. G. Shaw
Shaw, Frederick John Freshwater	1885–1936	Shaw
Shear, Cornelius Lott	1865–1956	Shear
Sheldon, John Lewis	1865–1947	Sheldon
Shen, C. I.		Shen
Sherbakoff, Constantine Dmitriev	1878–	Sherb.
Sherwin, Helen Shedd		Sherwin
Shirai, Mitsutaro	1863–1932	Shirai
Shope, Paul Franklin	1894–	Shope
Sibthorp, John	1758–1796	Sibth.
Sicard, Guillaume	1829–1886	Sicard
Sideris, Christos Plutarchos	1891– 1965	Sideris
Siegler, Eugene Alfred	1891–	Siegler
Siemaszko, Wincenty	1887–	Siem.
Siggers, Paul Victor	1889–	Siggers
Simmonds, John Howard		Simmonds
Sinden, James Whaples	1902–	Sinden
Singer, Rolf	1906–	Sing.
Skaptason, Joseph Bijorn		Skapt.
Skolko, Arthur John	1912–	Skolko
Škorić, Vladimir		Škor.
Slagg, Charles Mervyn	1890–	Slagg
Smarods, J.		Smarods
Smith, Alexander Hanchett	1904– 86	A. H. Sm.
Smith, Annie Lorrain	1854–1937	A. L. Sm.
Smith, Charles Leonard	1866– ?	C. L. Sm.
Smith, Clayton Orville	1871–1955	C. O. Sm.
Smith, Elizabeth Hight	1877–1933	E. H. Sm.
Smith, Erwin Frink	1854–1927	E. F. Sm.
Smith, Helen V.		H. V. Sm.
Smith, James Edward	1759–1828	J. E. Sm.
Smith, Kenneth Manley	1892–	K. M. Sm.
Smith, Marion Ashton	1897–	M. A. Sm.
Smith, Ralph Eliot	1874–1953	R. E. Sm.
Smith, Worthington George	1837–1917	W. G. Sm.
Snell, Walter Henry	1889– 1980	Snell
Snowden, J. D.		Snowden
Snyder, Leon Carlton	1908–	L. C. Snyd.
Snyder, Lillian		L. Snyd.
Snyder, William Cowperthwaite	1904– 80	Snyd.
Solheim, Wilhelm Gerhard	1898– 1978	Solh.
Sollman, August		Sollm.
Solovjev (Soloviev), F. A.		Solov.
Sommerfelt, Søren Christian	1794–1838	Sommerf.
Sopp, Johan-Olsen, Olav		Sopp
Soppitt, Henry Thomas	1858–1899	Soppitt
Sorauer, Paul Carl Mortiz	1838–1916	Sor.
Sorokin, Nikolai Vasilevich	1846–1909	Sorok.

Sousa da Camara, Manuel de. *See* Camara.		
Southworth, Effie Almira (Spalding)	1860–1947	Southworth
Sowerby, James	1757–1822	Sow.
Sparrow, Fredrick Kroeber	1903– 77	Sparrow
Spaulding, Perley	1878–	Spauld.
Speare, Alden True	1885–	Speare
Spegazzini, Carlos Luis	1858–1926	Speg.
Spencer, Edwin Rollin	1881–	Spencer
Spessa, Carolina		Spessa
Spieckermann, Albert	1871–	Spieck.
Spieshnev, Nikolai (Speschnew)	1844(?)–1907	Spiesh.
Splendore, Achille	1867–1928	Splendore
Sprague, Roderick	1901–	Sprague
Sprengel. Kurt Polycarp Joachim	1766–1833	Spreng.
Stahel, Gerold	1887–	Stahel
Stakman, Elvin Charles	1885–1979	Stakman
Standring, Elizabeth T.		Standring
Stansfield, O. P.		Stansf.
Stapp, Carl	1888–	Stapp
Starbäck, Karl	1863–1931	Starb.
Staritz, Richard	? –1922	Staritz
Starr, Mortimer Paul	1917–	Starr
Stedman, John Moore	1864–	Stedman
Steinbuch, J. C.		Steinbuch
Steiner, Gotthold	1886–	Steiner
Steinmann, B. Alfred	1892–	Steinm.
Stelling-Dekker, N. M.		Stell.-Dekk.
Stevens, Frank Lincoln	1871–1934	F. L. Stevens
Stevens, Neil Everett	1887–1949	N. E. Stevens
Stevenson, John Albert	1890–1979	Stevenson
Stevenson. William C.	1848–1919	W. C. Stevenson
Stewart, Dewey	1898–	D. Stewart
Stewart, Fred Carlton	1868–1946	Stewart
Stewart, Vern Bonham	1888–1918	V. B. Stewart
Steyaert, René L.	1905–	Stey.
Stifler, Cloyd Burnley (Mrs. James M.)	–1956	Stifler
Stone, Roland Elisha	1881–1939	Stone
Stoneman, Bertha M.	1866–1943	Ston.
Störmer, Fredrik Carl Mülerz	1874-	Störm.
Stouffer, David James		Stouffer
Stout, Gilbert Leonidas	1898–	Stout
Strauss. Fridrich Carl Joseph von	1787–1855	Strauss
Strunk, H. F.		Strunk
Sturgis, William Codman	1862–1942	Sturgis
Sturm, Jacob	1771–1848	Sturm
Subramaniam, Lekshminarayanapuram S.	1890–	Subr.
Sumstine, David Ross	1870–1965	Sumstine
Sundararaman, S. (Sundaram)		Sund.
Sutherland-Campbell, H.		Suth.-Campb.
Swanton, Ernest William	1870–1958	Swanton
Swartz, Olof Peter	1760–1818	Sw.
Swift, Marjorie Elizabeth		Swift
Swingle, Deane Bret	1879–1944	D. B. Swing.
Swingle, Walter Tennyson	1871–1952	Swing.
Sydow, Hans	1879–1946	Syd.
Sydow, Paul	1851–1925	P. Syd.
Tai, Fang Lan	1893–1973	Tai
Takahashi, Yoshinao	? –1914	Tak.
Takimoto, Kiyosumi		K. Takimoto
Takimoto, Seito		Takimoto
Tanaka, N.		N. Tan.
Tanaka, Tyôzaburô		T. Tan.
Tapke, Victor Ferdinand	1890–	Tapke
Tassi, Flaminio	1851– ?	Tassi
Taubenhaus, Jacob Joseph	1885–1937	Taub.
Taylor, Albert Lorenzo	1905–	Taylor
Tehon, Leo Roy	1895–1954	Tehon
Teng, K. L.		K. Teng
Teng, S. C.		S. Teng
Tengwall, Tor Åke	1892–	Tengwall
Tepper, Johann Gottlieb Otto	1941– ?	Tepper
Texeira, Alcides Ribeiro		Texeira
Tharp, Benjamin Carroll	1885–	Tharp
Thaxter, Roland	1858–1932	Thaxt.
Theis, Thomas	1917–	Theis
Theissen, Ferdinand	1877–1919	Th.
Thirumalacher,Mandayani Jeersannidhi	1914–	Thirum.
Thom, Charles	1872–1956	Thom
Thomas, Friedrich August Wilhelm	1840–1918	F. Thomas
Thomas, Harold Earl	1900–	Harold E. Thomas
Thomas, Harvey Earl	1890–	H. E. Thomas
Thomas, Roy Curtis	1887–	R. C. Thomas
Thomé, Otto Wilhelm	1841– ?	Thomé
Thompson, Bertha Emogene	1871–1925	B. E. Thompson
Thompson, Charles Henry	1870–1931	C. H. Thompson
Thompson, George Edward	1903–1960	G. E. Thompson
Thore, Jean	1762–1823	Thore
Thornberry, Halbert Houston	1902–	Thornberry
Thuemen, Felix Karl Albert Ernst Joachim von	1839–1892	Thuem.
Thuret, Gustave Adolphe	1817–1875	Thuret
Thurston, Henry Winfred	1893–	Thurston
Tieghem, Phillippe Edouard Leon van	1839–1914	v. Tiegh.
Tilford, Paul Edward	1900–	Tilford
Timmermans, Adrianna J.		Timmerm.
Tims, Eugene Chapel	1894–	Tims
Tiraboschi, Carlo		Tiraboschi
Tisdale, William Burleigh	1890–	Tisdale
Tisdale, Wendell Holmes	1892–	W. Tisdale
Tison, Adrien	1893–	Tison
Tochinai, Yoshiniko		Toch.
Tode, Heinrich Julius	1733–1797	Tode
Togashi, Kogo	1895–1952	Togashi
Tognini, Filippo	1867–1896	Togn.
Tomoyasu, Ryokichi		Tomoyasu
Toni, Giovanni Battista de	1864–1924	de T.
Toro, Rafael Andres	1897–	Toro
Torrend, Camillo	1875–	Torrend
Torrey, John	1796–1873	Torr.
Totten, Henry Roland	1892–	Totten
Tournefort. Joseph Pitton de	1656–1708	Tourn.
Townsend, Charles Orvin	1863–1937	Town.
Trabut, Louis	1853–1929	Trabut
Tracy, Samuel Mills	1847–1920	Tracy
Trail, James William Helenus	1851–1919	Trail
Tranzschel, Waldemar Andreevich	1868–1942	Tranz.
Trattinnick. Leopold	1764–1849	Tratt.
Traverso, Giovanni Battista	1878–1914	Trav.
Trelease, William	1857–1945	Trel.
Trentepohl, Karl		Trent.
Trevisan, Vittore Benedetto Antonio	1818–1897	Trev.
Trinchieri, Giulio		Trinch.
Trog, Jakob Gabriel	1781–1865	Trog
Trotter, Alessandro	1874–1926	Trott.
Trow, Albert Howard	1863–1939	Trow
Truscott, John Henry Lloyd	1905–	Truscott
Trusova, Nina Petrovna	1884–	Trusova
Tubeuf, Karl von	1862–1941	Tub.
Tucker, Clarence Mitchell	1897–1954	Tucker
Tuckerman, Edward	1817–1886	Tuckerm.

Tulasne, Charles	1816–1884	C. Tul.
Tulasne, Edmond Louis René (The Tulasne brothers are commonly cited jointly as Tul.)	1815–1885	Tul.
Tullis, Edgar Cecil	1901–	Tullis
Turconi, Malusio	1879–1929	Turc.
Turner, Elizabeth M.		Turner
Ulbrich, Eberhard	1879–1952	Ulb.
Ule, Ernst Heinrich Georg	1854–1915	Ule
Ullstrup, Arnold John	1907–	Ullstrup
Unamuno, Luis M.	1873–1943	Unamuno
Underwood, Lucien Marcus	1853–1907	Underw.
Unger, Franz Joseph Andreas Nicolaus	1800–1870	Ung.
Uppal, Badri Nath		Uppal
Vahl, Martin Hendriksen	1749–1804	Vahl
Vaillant, Sebastian	1669–1722	Vaill.
Valleau, William Dorney	1891–	Valleau
Van Beyma Thoe Kingma, T. H.	1885–1966	van Beyma
Van Breda de Haan. *See* Breda de Haan.		
Van der Bijl. *See* Bijl, Paul Andries van der.		
Van Hall. *See* Hall, Constant J. J. van.		
Van Hook, James Mon	1870–1935	Van Hook
Vanin, Stephan Ivanovich	1890–	Vanin
Van Luijk, Abraham. *See* Luijk, A. van.		
Van Overeem. *See* Overeem.		
Vanterpool, Thomas Clifford	1898–1984	Vanterpool
Van Tieghem. *See* Tieghem.		
Veihmeyer, Frank J.	1886–	Veihmeyer
Velenovsky, Josef	1858–1949	Velenov.
Venturi, Antonio	1805–1864	Venturi
Verplancke, Germain		Verpl.
Verrall, Arthur Frederic	1905–	Verrall
Verwoerd, Len		Verwoerd
Vestergren, Jacob Tycho Conrad	1875–1930	Vest.
Viala, Pierre	1859–1936	Viala
Viégas, Ahmés Pinto		Viégas
Viennot-Bourgin, Georges	–1986	Vien.-Bourg.
Villars, Dominique	1745–1814	Vill.
Vincens, François	1880–1925	Vincens
Vittadini, Carlo	1800–1865	Vitt.
Viviani, Domenico	1772–1840	Viviani
Vize, John Edward	1831–1916	Vize
Vizioli, José		Vizioli
Vleugel, Jens Schanke	1854–1927	Vleug.
Voglino, Pietro	1864–1933	Vogl.
Volkart, Albert	1873–	Volk.
Von Hoehnel (von Höhnel). *See* Hoehnel, F. von.		
Von Schrenk. *See* Schrenk.		
Voorhees, Richard Kenneth	1907–	Voorhees
Voronikhin. *See* Woronichin.		
Vuillemin, Jean Paul	1861–1932	Vuill.
Wadkins, R. F.		Wadkins
Wagener, Willis Westlake	1892–1969	Wagener
Wahlenberg, Göran	1780–1851	Wahl.
Waite, Merton Benway	1865–1945	Waite
Wakefield, Elsie Maud	1886–1972	Wakef.
Wakker, Jan Hendrik	1859–1927	Wakk.
Waksman, Selman Abraham	1888–1973	Waks.
Waldee, Edward Leslie	1910–	Waldee
Waldheim. *See* Fischer von Waldheim.		
Walker, John Charles	1893–	J. C. Walker
Walker, Leva Belle	1878–	L. B. Walker
Wallays, Antoine Charles Francois	1812–1881	Wallays
Wallroth, Karl Friedrich Wilhelm	1792–1857	Wallr.
Walter, Thomas	1740–1789	Walter
Walters, Maurice Burke	1891–	Walters
Ware, W. M.	1892–1955	Ware
Warming, Johannes Eugenius Bülow	1841–1924	Warming
Wartmann, Friedrich Bernhard	1830–1902	Wartm.
Wassiliewski (Vassilievski), C.	1844–1950	Wass.
Watanabe, Tatsuwo		Watanabe
Waterman, Alma May	1893–	Waterman
Waterston, John MacLaren	1911–	Waterston
Watson, Alice Johnson	1898–	A. J. Wats.
Watson, Elizabeth		E. Wats.
Webber, Herbert John	1865–1946	Webber
Weber, Carl		C. Weber
Weber, George Frederick	1894–	G. F. Weber
Weedon, Amy Gertrude		Weedon
Weese, Josef	1888–	Weese
Wehmer, Carl	1858–1935	Wehmer
Wehmeyer, Lewis Edgar	1897–	Wehm.
Wei, C. T.		Wei
Weimer, James LeRoy	1887–	Weimer
Weinmann, Johann Anton	1782–1858	Weinm.
Weir, James Robert	1881–1943	Weir
Weiss, Freeman Albert	1892–1985	Weiss
Welch, Donald Stuart	1894–	Welch
Welles, Colin Gilchrist		Welles
Wellman, Frederick Lovejoy	1897–	Wellman
Went, Friedrich August Ferdinand Christian	1863–1935	Went
Werdermann, Erich		Werdermann
Wernham, Clifford Charles	1903–	Wernham
West, Erdman	1894–1965	E. West
Westendorp, Gérard Daniel	1813–1868	West.
Westerdijk, Johanna	1883–1961	Westerd.
Westling, Per Richard	1868–	Westling
Weston, William Henry	1890–1978	Weston
Wettstein, Richard von	1863–1931	Wettst.
Whetzel, Herbert Hice	1877–1944	Whet.
Whiffen, Alma Joslyn	1916–81	Whiffen
White, Harold Everett	1899–	H. E. White
White, Richard Peregrine	1896–	R. P. White
White, Violetta Susan Elizabeth	1875–	V. White
White, William Lawrence	1903–1952	W. L. White
Wiggers, Fredrich Heinrich	1752–1828	Wigg.
Wilcox, Edwin Mead	1876–1931	E. M. Wilcox
Wilcox, Marguerite Statira	1902–	M. S. Wilcox
Wilcox, Raymond Boorman	1889–1949	R. B. Wilcox
Wildeman, Emile de. *See* de Wildeman.		
Wilhelm, Karl Adolf	1848–1933	Wilhelm
Willdenow, Carl Ludwig	1765–1812	Willd.
Wille, Johan Nordal Fischer	1858–1924	Wille
Willey, Henry	1824–1907	Willey
Williamson, Maude Miller		Williamson
Willkomm, Henrich Moriz	1821–1895	Willk.
Wilson, Edward Elmer	1900–	E. E. Wils.
Wilson, Guy West	1877–	G. W. Wils.
Wilson, Malcolm	1882–1960	M. Wils.
Wiltshire, Samuel Paul	1891–1967	Wiltsh.
Wineland, Grace Odel (Pugh)	1889–	Wineland
Wingard, Samuel Andrew	1895–	Wingard
Wingate, Harold	1852–1926	Wingate
Winge, Øjvind	1886–1964	Winge
Winslow, Charles-Edward Amory	1877–1957	Winsl.

Winter, Heinrich Georg	1848–1887	Wint.
Wirtgen, Philip Wilhelm	1806–1870	Wirtgen
Withering, William	1741–1799	With.
Wolf, Frederick Adolphus	1885–1975	Wolf (7 xi. 75)
Wolf, Frederick Taylor	1915–	F. T. Wolf
Wollenweber, Hans Wilhelm	1879–1949	Wr.
Wormøld, Hugh	1579 - 1955	Wormøld
Wormskjold, Martin	1783–1845	Wormsk.
Woronichin (Voronikhin), Nikolai Nikolaevich	1882–	Woron.
Woronin, Michel Stepanovich	1838–1903	Wor.
Wright, Jorge Eduardo	1922–	Wright
Wróblewski, Anton		Wrób.
Wulfen, Franz Xavier von	1728–1805	Wulf.
Yamada, Gentaro	? –1943	Yam.
Yamagiwa, Suewo		Yamag.
Yamamoto, Wataro		Yamamoto
Yates, Henry Stanley	1886–1938	Yates
Yoshii, Hazime	1900–	Yoshii
Yoshimura, Fuji		Yoshimura
Yoshinago, Torama		Yoshinago
Yoshino, Kiichi		Yoshino
Young, Esther (True)	1893–	E. Young
Young, Paul Allen	1898–	P. A. Young
Zahlbruchner, Alexander	1860–1938	Zahlbr.
Zaprometov, Nikolai Georgievich (Zaprometoff)		Zaprom.
Zaumeyer, William John	1903–	Zaum.
Zebrowski, George	1895–	Zebrowski
Zeller, Sanford Myron	1885–1948	Zeller
Zentmyer, George Aubrey	1913–	Zentm.
Zimmermann, Albrecht	1860–1931	Zimm.
Zimmermann, H.		H. Zimm.
Zinssmeister, Carl Luther	1918–	Zinss.
Zobel, Rolf		Zobel
Zopf, Friederich Wilhelm	1846–1909	Zopf
Zukal, Hugo	1845–1900	Zukal
Zundel, George Lorenzo Ingram	1885–1950	Zundel

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